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BIOSPACE/DYABOLIC October 2010 Field Program Monterey Bay, California Data Report

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14. ABSTRACT During October 9–22, 2010, NRL conducted a field experiment in Monterey Bay, California. Personnel from the NRL Ocean Sciences (Code 7330) and Coastal and Ocean Sensing (Code 7230) Branches, and the Monterey Bay Aquarium Research Institute (MBARI) were aboard the UNOLS Research Vessel “Pt. Sur.” During the same time period, additional Code 7230 personnel performed a series of flights over the Bay aboard an airplane equipped with hyperspectral remote sensing instruments. This document contains a description of the NRL activities, sampling instrumentation, methods, and data processing. Plots of the monthly timeseries data are followed by plots from each day of October 2010 (organized by hydrocast number) and brief notes on the environment from cruise and flight logs. This is not a complete set of all data products collected or derived and is intended only to provide an overview and serve as a basis for further investigation. The plots presented in the document are not necessarily final versions; additional quality control and/or processing steps may be found necessary.					
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BIOSPACE / DYABOLIC October 2010 Field Program Monterey Bay, California

Data Report

Introduction

During October 9-22, 2010 NRL conducted a field experiment in Monterey Bay, California. Personnel from the NRL Ocean Sciences (Code 7330) and Coastal and Ocean Sensing (Code 7230) Branches, and the Monterey Bay Aquarium Research Institute (MBARI) were aboard the UNOLS Research Vessel *Pt. Sur*. During the same time-period, additional Code 7230 personnel performed a series of flights over the Bay aboard an airplane equipped with hyperspectral remote sensing instruments. These activities were carried out in support of three NRL base program projects: “Bio-Optical Studies of Predictability and Assimilation in Coastal Environments” (BIOSPACE); “Modeling Dynamic Bio-Optical Layers in Coastal Systems” (DYABOLIC); and “Determining All Inherent Optical Properties Of Coastal Waters With An Off-Nadir Airborne Hyperspectral Sensor.”

In addition, these activities were coordinated with the activities of several collaborators under the title “BloomEx” (which included the “LatMix” project). Our partners included additional researchers from MBARI, investigators from the Naval Postgraduate School (NPS), the University of California at Santa Cruz (UCSC), the University of California at Berkeley (Cal), the University of Southern California (USC), Stanford University, California Polytechnic State University (CalPoly), NOAA CoastWatch, Scripps Institute of Oceanography, Rutgers University, NASA JPL, and Liquid Robotics Inc.

This document contains a description of the NRL activities, sampling instrumentation, methods, and data processing. What follows are plots of the data collected from the R/V *Pt. Sur* and the assets deployed from her (NRL Barney moorings and NRL gliders). At the time of this report, processing of the aircraft data is underway, consequently no aircraft imagery or data products are included. Plots of the monthly timeseries data are followed by plots from each day of October 2010 (organized by hydrocast number) and brief notes on the environment from cruise and flight logs. This is not a complete set of all data products collected or derived and is intended only to provide an overview and serve as a basis for further investigation.

The plots presented in the document are not necessarily final versions; additional quality control and/or processing steps may be found necessary. Please contact the author for the appropriate contact person to request the latest versions of the digital data and data use policy.

Field Program Overview

R/V Pt. Sur and Aircraft Operations - Cruise dates October 9-22, 2010.

October 9 and 10 - Mooring deployments (Barneys and T-strings).

October 11 - R/V Pt. Sur in port with ScanFish winch problems most of the day. Clear skies, NRL aircraft imaged flight lines in northern Bay (off Santa Cruz) over large dinoflagellate bloom.

October 12 - Glider calibrations in Soquel Cove (Casts 2 and 4). Glider deployment. Casts at mooring locations (Casts 5-8). Clear skies over entire Bay, NRL aircraft imaged along flight lines in NE Bay, imaged over ship location at the end of the flight.

October 13 ScanFish NE Bay, then offshore (north and central lines - central line was approximately CalCOFI Line 67). Flow-through water samples taken as we passed planned CTD stations. Marine layer covering most of the Bay except near Monterey. NRL aircraft able to image farther offshore than ship track and in Monterey area.

October 14 ScanFish calibration at end of tow (Cast 9). Stations taken from central offshore to near M0 mooring line (Casts 10-16), casts at same locations as flow-through samples from previous day. NRL aircraft imaged over the same line in both offshore and onshore directions, passed over ship near station 20, then over red plumes near MBARI and in the north part of the Bay.

October 15 Stations along southern offshore line and around the Monterey Peninsula (Casts 17-22). ScanFish, southern offshore line overnight. Marine layer over most of Bay, NRL aircraft imaged near Monterey and Seaside.

October 16 Station grid in NE Bay (Casts 23-31). Overcast - no flight operations. ScanFish survey, along opening of Bay (NW-SE) and then parallel (SE-NW) in mid-Bay.

October 17 First time-series attempt. Dinoflagellate bloom not found at previous day's location, spent most of day searching for the bloom (Casts 32-39). Found dinoflagellate patch outside of Bay off Davenport (station 16) at 1457 PDT and began time series until dark - 1930 (Casts 40-43). Overcast - no flight operations.

October 18 Two parallel outer Bay (across Bay) water sample lines (Casts 44-51). Clear skies over much of Bay, NRL aircraft imaged over the same lines as ship, overflow ship at stations 6, 7, and 10. ScanFish overnight in NW Bay.

October 19 Found dinoflagellate bloom at previous location off Santa Cruz (station 5) at 0800 PDT began second time-series (casts 52-56) until noon; Left station to recover glider SL082 ("Groucho") and perform a post-calibration (cast 57). Very foggy day, no flight operations over water, end of aircraft operations. Returned to port to drop off two science team members. End of optics casts.

October 20 Flow-through water samples on way to recover glider SL077 ("Harpo"). Post-calibration of glider (cast 58).

October 21 Searched (unsuccessfully) for *Pseudo-nitzschia* bloom to retrieve domoic acid samples for UCSC and MBARI in NE and central Bay (Casts 59-64).

October 22 Recovered moorings. End of cruise operations.

Aircraft Based Hyperspectral Imagers

Instruments flown: CASI (72 bands, 382-1050nm), microSHINE (64 bands, 348-987nm), and POS (GPS/INS). Data archival, organization, and logging (i.e. determining good lines, glint, too dark etc.), radiometric correction, and preliminary geo-location have been: completed (5/10/2011). Bore-siting/bundle adjustment and atmospheric correction are underway.

Satellite Observations

SeaWiFS (1km), MODIS (250m, 1km), and MERIS (300m, 1km) imagery were taken and processed by the NRL APS (automated processing system). Derived data includes sea surface temperature, chlorophyll, and inherent optical properties (IOP) from the quasi-analytical algorithm (QAA).

HICO

Only one daylight pass of the Hyperspectral Imager for the Coastal Ocean (HICO) aboard the International Space Station (ISS) was calculated to occur over the Monterey Bay area near the experiment time frame - October 10 at ~160900 GMT. The orbit was to pass to the east of California's Central Valley. Calculating the angle to Monterey Bay by hand indicated that a Monterey Bay target would be at about a 32 degree angle from the ISS. However, there was a scheduled docking (GMT 282-283) and then a thruster test (GMT283-284) and no images could be taken.

Instruments, Methods and Data Processing

Note on Fluorometer data

Fluorometer data calibrated with bottle chlorophyll data is noted (calibrated), otherwise it is uncalibrated data. All fluorometer plots are uncorrected for non-photochemical quenching.

Underway Data Acquisition System

The Underway Data Acquisition System (UDAS) on the R/V Point Sur consists of a suite of meteorological and sea surface sensors sampling at ~ 1 minute averages when the vessel is away from the dock. A constant flow of seawater (originating from an intake on the ship's seachest, just below the sea surface, ~ 3m) feeds the sensors and drains into a sink/drain in the Main Lab. The following sensors were included in the system: SBE21 Thermosalinograph w/ incorporated remote Sea-Bird Electronics SBE3 temperature sensor, Wetlabs ECOFL Fluorometer, WetLabs 25cm pathlength CStar Transmissometer. In the wet lab, our MBARI collaborators plumbed additional instruments to the flow-through stream: two fast repetition rate fluorometers (FRRF) and a CO₂ sensor. In addition, meteorological and navigation sensor data are part of the UDAS data stream.

During our Scanfish towing operations, water samples were taken from the flow-through system for extracted chlorophyll, HPLC, filter pad absorption, TSS, and flow-cytometry.

CTD

The Standard CTD instrumentation package aboard the R/V Point Sur consists of the following sensors in addition to a Sea-Bird Electronics (SBE) SBE 9+ CTD: Dual SBE 3Plus Temperature, SBE 4C Conductivity Sensors, SBE 43 Dissolved Oxygen Sensor, Wet Labs CST 25cm path length Transmissometer, Wet Labs ECO Fluorometer, and Tri-Tech Altimeter. Water samples were obtained with an array of 12 (5 L) Niskin bottles on the rosette.

Nutrients

Profiles of water samples were taken from the Niskin bottles, ~10 ml sample stored in plastic scintillation vials, and frozen (-20 °C) until processing with an AlpChem auto-analyzer at MBARI for PO₄, SiO₄, NO₃, and NO₂.

Extracted chlorophyll (phaeopigments, size fractionation)

Profiles of water samples were taken from the Niskin bottles and 280 ml of sample filtered through 25 mm Whatman GFF (glass fiber filters) at 5-7 mm Hg pressure. The filters were then placed into glass scintillation vials with 10 ml of 90% acetone and placed in freezer for 24 hours to allow acetone to extract the chlorophyll. Chlorophyll fractionations were performed for surface water samples by filtering 100 ml of surface water through 1 and 5 um nuclepore filters, glass scintillation vials with 10 ml of and stored in of 90% acetone and placed in the freezer. Before processing, samples were allowed to warm for several hours in the dark. Measurements were done with a Turner 10-AU Fluorometer. After first reading samples were acidified with three drops of 5% HCl (to destroy the Chlorophyll) allowing the measurement of phaeophytin.

Optics Profiling Package

The optics cage carried two WET Labs **AC9** absorption and attenuation meters (one unfiltered, one filtered to provide CDOM information), a HOBI Labs **HydroScat-6** (backscattering at 6 wavelengths), a WET Labs Underwater Bioluminescence Assessment Tool (**UBAT**), a Sequoia Scientific Laser In-Situ Scattering and Transmissometer (**LISST**), SeaBird Electronics SBE-49 (FastCat) **CTD**, WET Labs **ECO-BB2F** (660 nm backscatter, Chlorophyll and CDOM fluorometer), and a WET Labs **DH-4** controller.

AC9 files were processed with NRL's IDL post-processing software, the data was corrected for changes in absorption due to temperature and salinity, Zaneveld (1994) scattering correction was applied to the absorption data and the Pope and Fry's (1997) pure water absorption values were added to the absorption and beam attenuation data. The **HydroScat** had the NRL sigma correction applied and surface (0-2 m) averages were computed.

The **UBAT** data was corrected for the flow rate of the instrument. The plots in this document show the binned data in gray and a smoothed profile in red.

LISST particle size data was processed with the LISST-SOP v4.65 software from Sequoia Scientific. Post-cruise calibrations were applied. This is a profiling instrument that measures the particle size distribution and beam attenuation coefficient at a single wavelength (532nm). The data derived are: the volume of particles in each size bin relative to the total volume of the water sampled (the units are in microliters per liter, or equivalently, parts per million); and the particle size distribution for each depth and size bin (the number of particles per cubic centimeter per micron). Note that these values are derived from the volume fraction data by assuming all particles are spheres. Obviously, this is an approximation, and in many cases a bad one, but it is still useful for many applications. The particle size distribution slope, assuming a hyperbolic shape, was also obtained. This is derived by fitting a straight line to the log-log data (Log(n) vs. Log(Size)), but only for sizes in the range from 2.92 – 111.22 microns. The volume fraction data should be correct (to within the instrument limitation) regardless of particle shape. However, keep in mind that it is a volume ratio, and not the number of particles, that is given. Since volume is going up roughly as size³, a single large particle gives a much greater volume fraction than a single small particle. Hence any “spikes” in the volume fraction data for the large particle sizes are most often caused by just a few particles that drift in and out of the sample volume during measurement.

MVSM

During the optics cast a multispectral volume scattering meter was deployed off the starboard (same as the CTD) and held at the surface (1-2 m depth) for the duration of the cast. Data have been processed and are in final form. The volume scattering function (VSF) was computed from corrected MVSM data and, where applicable, have been combined with the VSF from the LISST. All of these are at a wavelength of 532nm, with the exception of one at 555 (Cast 6).

Filter Pad and Dissolved Absorption

Water samples were taken from three bottles for absorption analysis. The depths were chosen by observation of the live view of the fluorometer trace during the downcast of the CTD rosette. In addition to a surface bottle sample, a sample was taken from the depth of the peak in the fluorometer profile and deep sample was taken from a depth below the layer where the fluorometer profile flattened out. Samples were filtered through 25 mm Whatman glass fiber filters (GFF); the filters were stored in liquid nitrogen (-196 °C) until analysis onshore. The absorption properties of the filtrate from each sample were measured with an Analytical Spectral Devices (ASD) FieldSpec 3 spectroradiometer with a spectral range of 350-2500 nm at 1 nm resolution to determine the CDOM absorption. In the lab the filter pads were thawed and their absorption properties were measured with the FieldSpec 3 to get the total particulate absorption. Next, the filter pads were treated with hot methanol (HPLC grade) to destroy pigments (bleach). Re-measurement yielded the absorption of detritus. Subtraction of the detrital fraction from the total particulate absorption yields the phytoplankton absorption fraction.

Total Suspended Solids (TSS)

At most stations, water samples from the same three bottles (as the filter pad absorption analysis above) were collected for TSS measurement (due to a limited number of prepared filters, at some stations only surface samples were taken). Pre-cruise, 45 mm glass fiber filters (GFF) were ashed at 550°C for 15 minutes and weighed to constancy on an Ohaus Analytical Plus balance. Sample water was filtered through the prepared filters, rinsed three times with 100 ml of MilliQ water to remove salts and refrigerated until post-cruise. In the lab, the sample + filter combo were dried at 103°C for 2 hours, cooled in a dessicator for ½ hour to achieve room temperature, then weighed to 5 decimal places. Samples were dried again as above and weigh again. This procedure provided TSS percent, particulate inorganic matter (PIM), and particulate organic matter (POM), and percent organic data.

HPLC

Water samples were collected from near-surface (~0.5m) Niskin bottles, 540 ml of water was filtered onto Whatman glass fiber filters (GFF), stored in liquid nitrogen (-196 °C) until shipped to the Horn Point Laboratory at the University of Maryland Center for Environmental Science for pigment analysis by high performance liquid chromatography (HPLC).

Flow cytometry

Two ml whole water samples were collected and preserved with 0.5 ml of 4% glutaraldehyde solution buffered with sodium cacodylate salts and kept refrigerated.

As of this draft (5/10/2011) these samples remain refrigerated awaiting the delivery of NRL's CytoBuoy scanning flow-cytometer.

Spectrix

SPECTRIX is a handheld, high sensitivity, compact spectrometer. It is capable of measuring optical spectra from 350 to 900 nm at 1.04 nm resolution with 2.5 nm half bandwidth. The handheld unit is composed of the spectrometer, microprocessor controller, power supply, and shutter.

HyperPro

A Satlantic hyperspectral profiling radiometer was deployed off the stern of the R/V Pt. Sur. The reference deck unit was mounted on a railing on the 01 deck. Three profiles were taken at each deployment. Data was processed with Satlantic ProSoft 7.7.10 software.

Microscope images (light and SEM)

Surface water was sampled with a plankton net and observed with an inverted light microscope. Photos in this report were taken through the eyepiece with an iPhone 4 camera. One surface water sample was preserved in a 4% glutaraldehyde solution buffered with sodium cacodylate salts and kept refrigerated until imaging on the NRL scanning electron microscope (SEM).

ScanFish

EIVA ScanFish MK II towed undulating vehicle system equipped with: WET Labs AC9, Ecopucks (BB3 and FL3), and C-star transmissometer; and a SeaBird SBE-49 (FastCat) CTD. Due to problems with the winch, ScanFish tows were limited to less than 80 meters depth.

Gliders

Two SLOCUM Battery Powered Gliders were deployed on either side of and parallel to the linear mooring (Barneys) line (see below). The gliders have an operating depth range of 4-200 meters and are instrumented with SeaBird CTDs, WET Labs Ecopucks (BB3 and FL3).

Moorings

Four trawl-resistant bottom mounted acoustic Doppler current profiler (ADCP) moorings – “Barneys” (S1-S4) were installed at four locations in a linear array on the northern Monterey Bay shelf.

Two high-resolution T-string moorings were installed near the Barneys S2 and S4. These strings had 8 and 12 (respectively) Sea-Bird Electronics SBE 37-SM MicroCAT conductivity and temperature sensors.

VMP

A vertical microstructure profiler (VMP) casts were performed several nights near the mooring locations. These data have not been processed as of this draft (5/20/2011).

Calendar

MBARI (et al.) CANON BloomEx dates: October 4 - 29, 2010

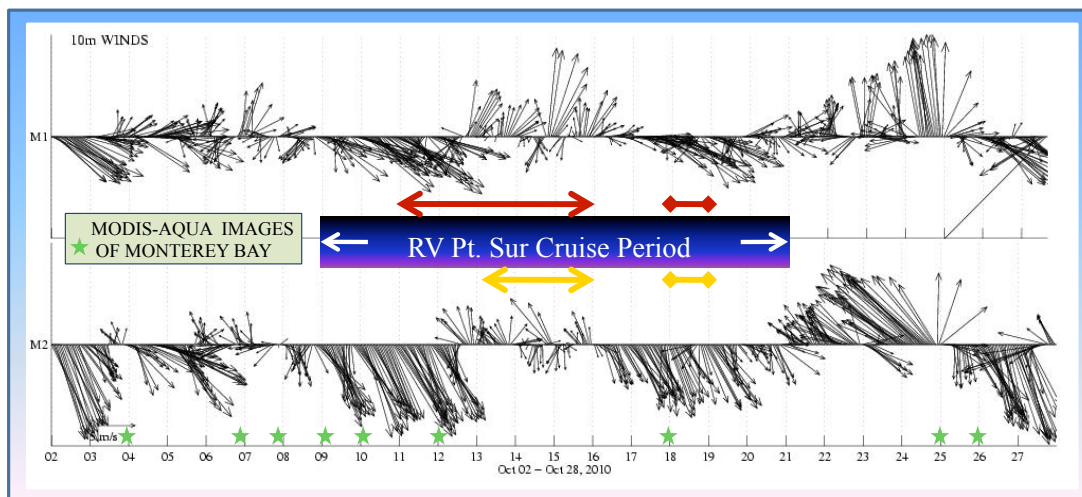
NRL BIOSPACE cruise dates: October 12 - 21, 2010

October 2010

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
26	27	28	29	30	1	2
Upwelling Winds 276	CANON Strong Upwelling winds 277	278	Relaxation 279	280	Upwelling Winds 274 275	
3	4	5	6	7	8	9
					Ship Loading 281	Upwelling winds Deploy Moorings 282
10	11	12	13	14	15	16
CANON Upwelling winds Deploy Moorings 283	In Port NRL Aircraft 284	Relaxation NRL Aircraft 285	Scanfish 286 NRL Aircraft 287	Upwelling winds 288 NRL Aircraft 289		
17	18	19	20	21	22	23
CANON BIOSPACE Cruise Upwelling winds "First Flush" rain event 290 3:00 PM Dredge/Flagellate Timeseries 1 (1500-1930)	291 Scanfish NRL Aircraft 292 Relaxation NRL Aircraft 8:00 AM Dredge/Flagellate Timeseries 2 (0800-1200)	293 Weak Upwelling winds 294		295	296	
24	25	26	27	28	29	30
CANON Relaxation Major rain event 297	Upwelling winds 298	299	Relaxation 300	301 302	303	
31	1	2	3	4	5	6
Relaxation 304						

Timeline

NRL ASSETS BIOSPACE/BloomEX/CANON FIELD PROGRAM - OCTOBER 2010



- ★ **Satellite** – MODIS-AQUA, MERIS-IOPs, Chlorophyll, Rrs
- ◆ **NRL Scanfish** – Ecopuck BB3 and FL3 (Chlorophyll, CDOM), AC9 and Cstar
- **RV Pt. Sur (NRL, MBARI)** – CTD, ADCP, flow through fluor., met, FRRF (2), CO₂

- ◆ **NRL Aircraft** – PHILLS, CASI, Microshine, and SWIR

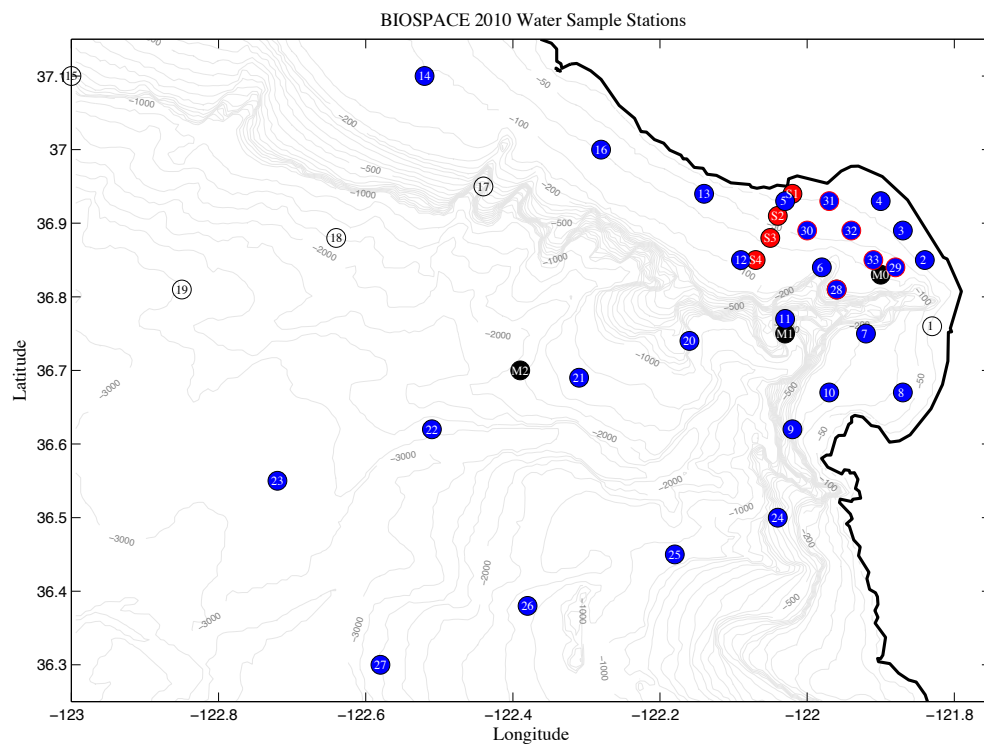
NRL Gliders – CTD, Ecopuck BB3 and FL3, Chlorophyll, CDOM, AUVb

NRL Moorings – CTD, BB2, Currents

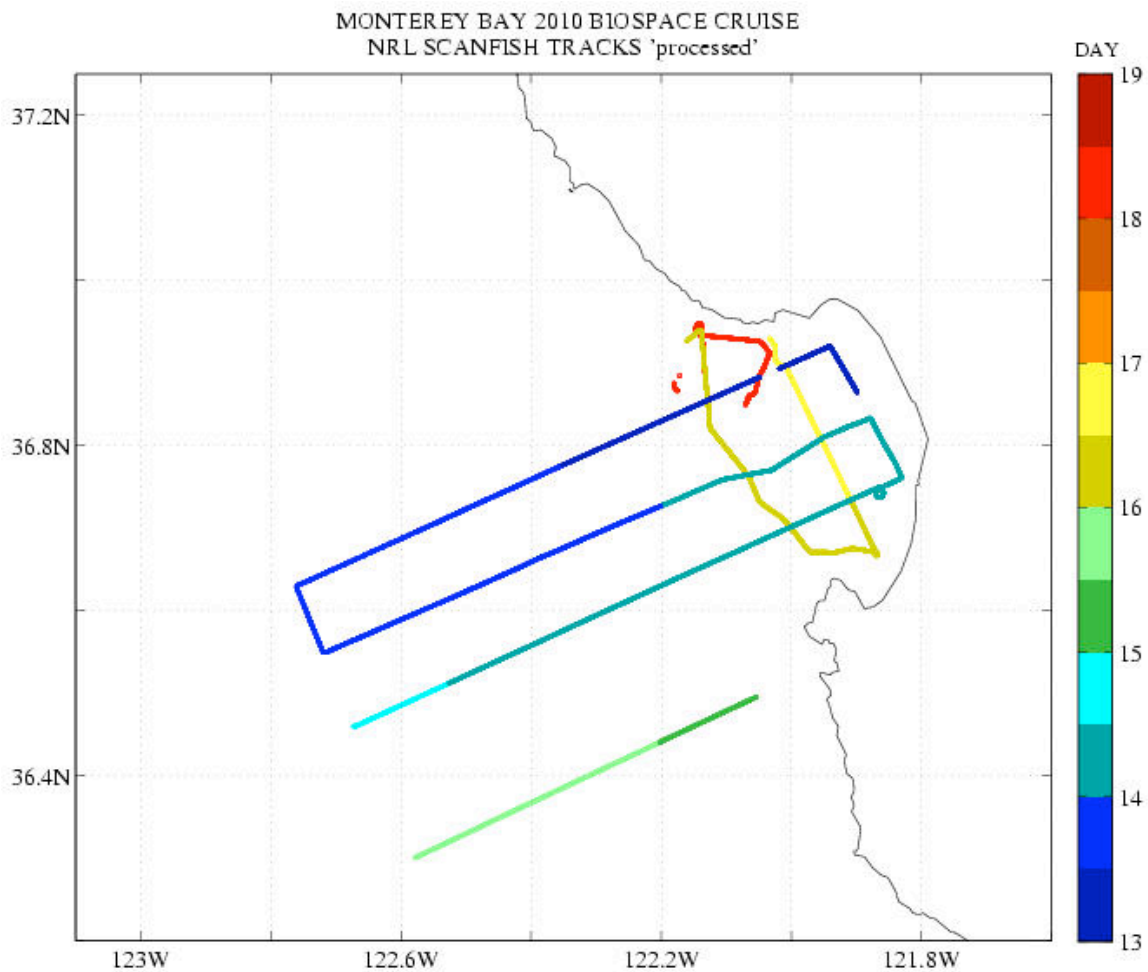
NRL Stations – Chlorophyll, nutrients (oxygen, nitrate, nitrite, silicate, phosphate), absorption (CDOM, total particulate, phytoplankton, detritus), Phaeo-Pigments, HPLC, TSS, Hyperpro, Spectrix

NRL Optical Package – Filtered AC9, ACS, ECOVSF, Ecopuck (BB and FL), LISST, MVSM, flow cytometry, UBAT, and fluorometer

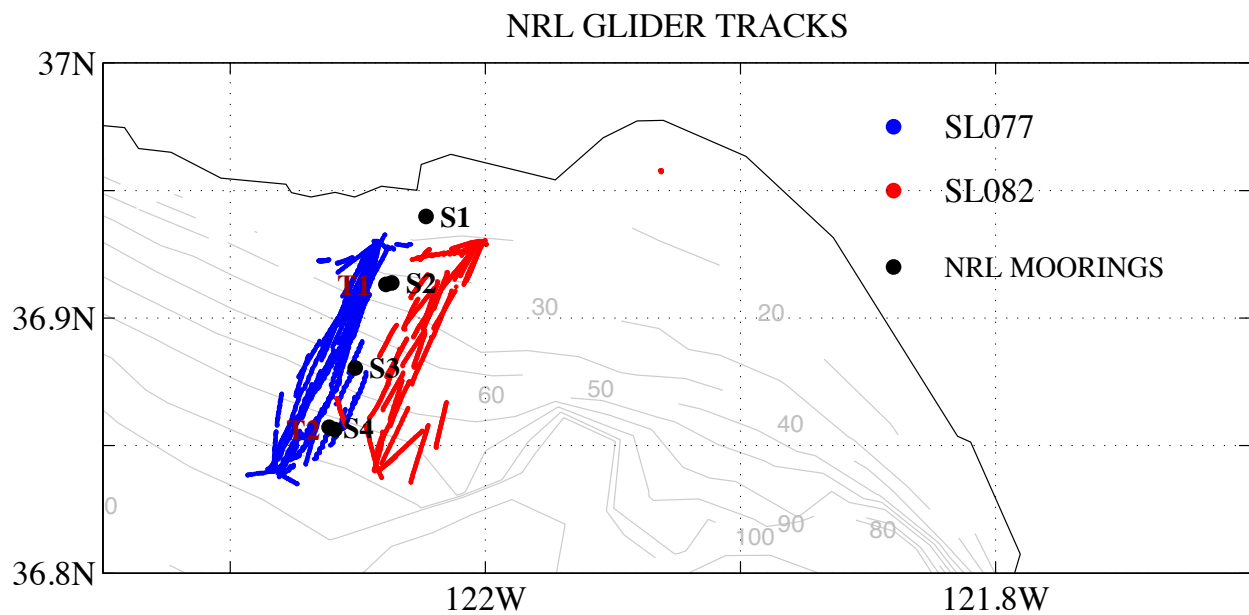
Station Locations



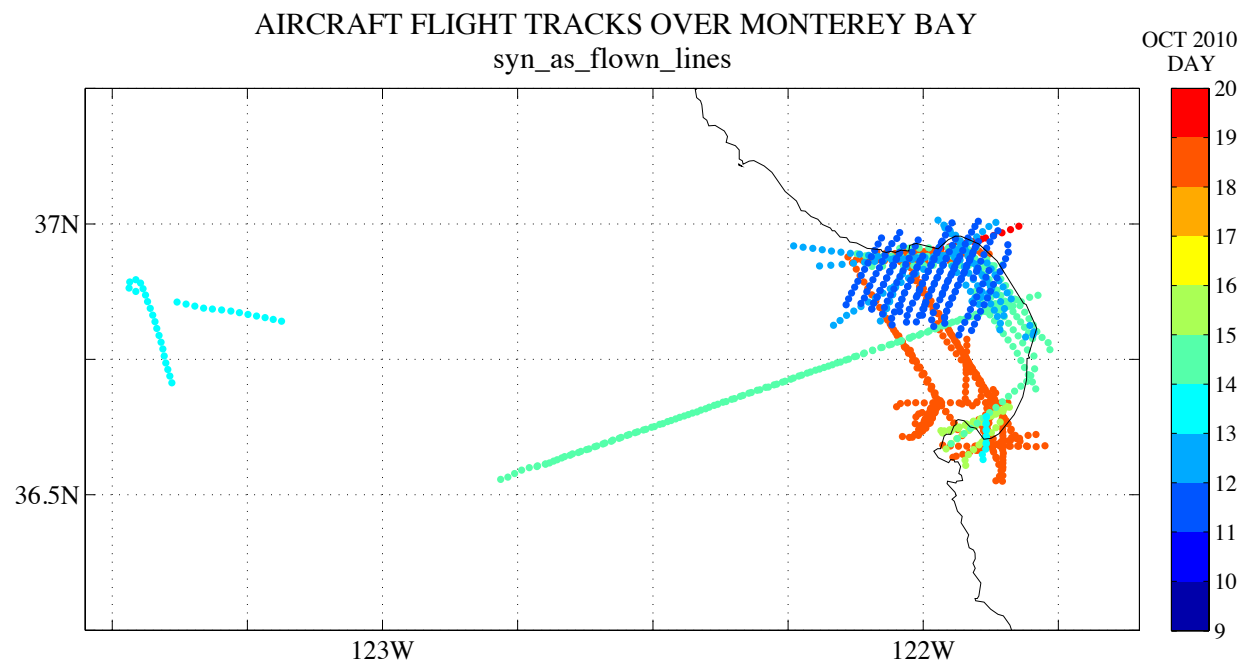
Scanfish Tracks



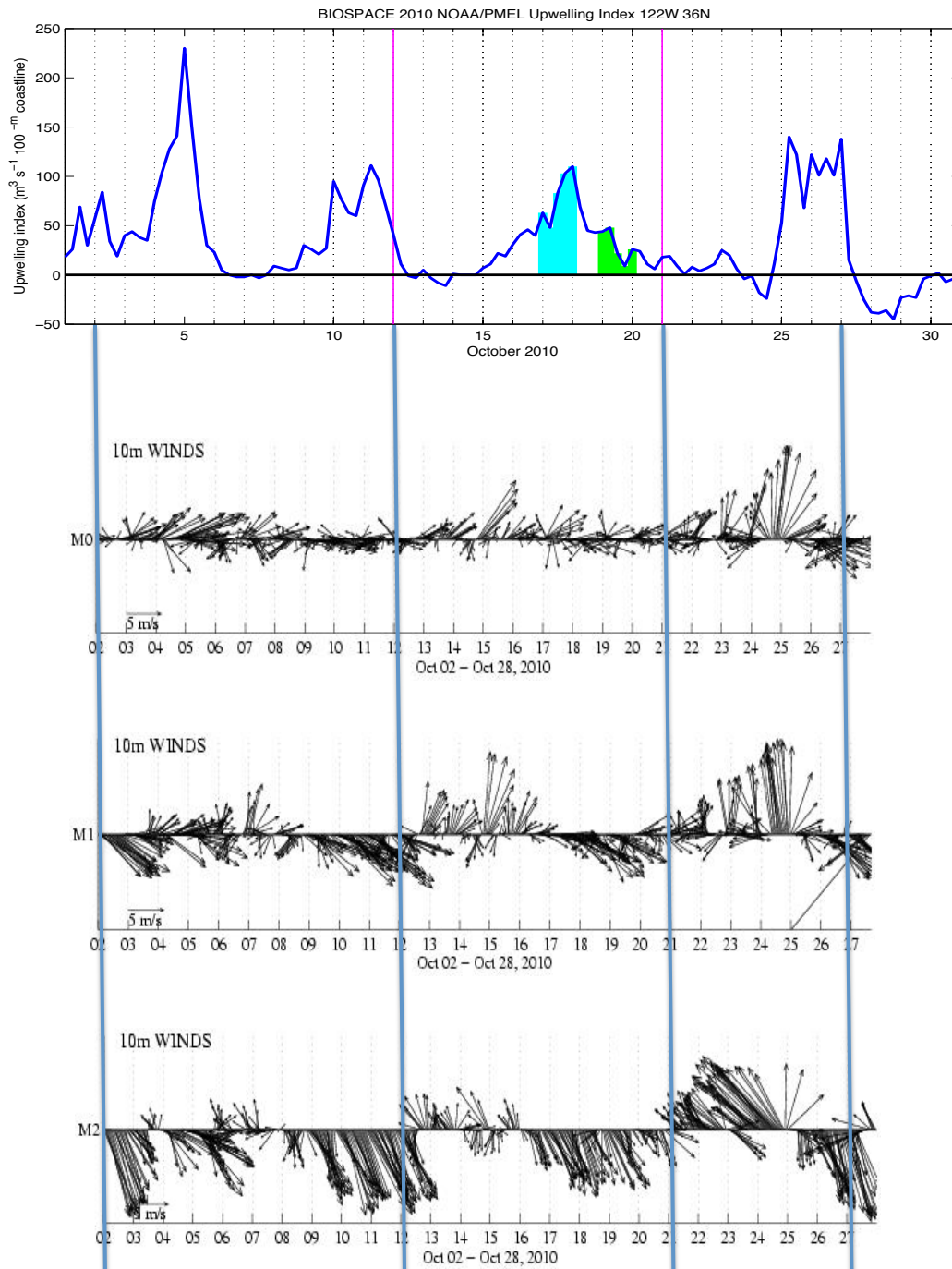
Glider Tracks



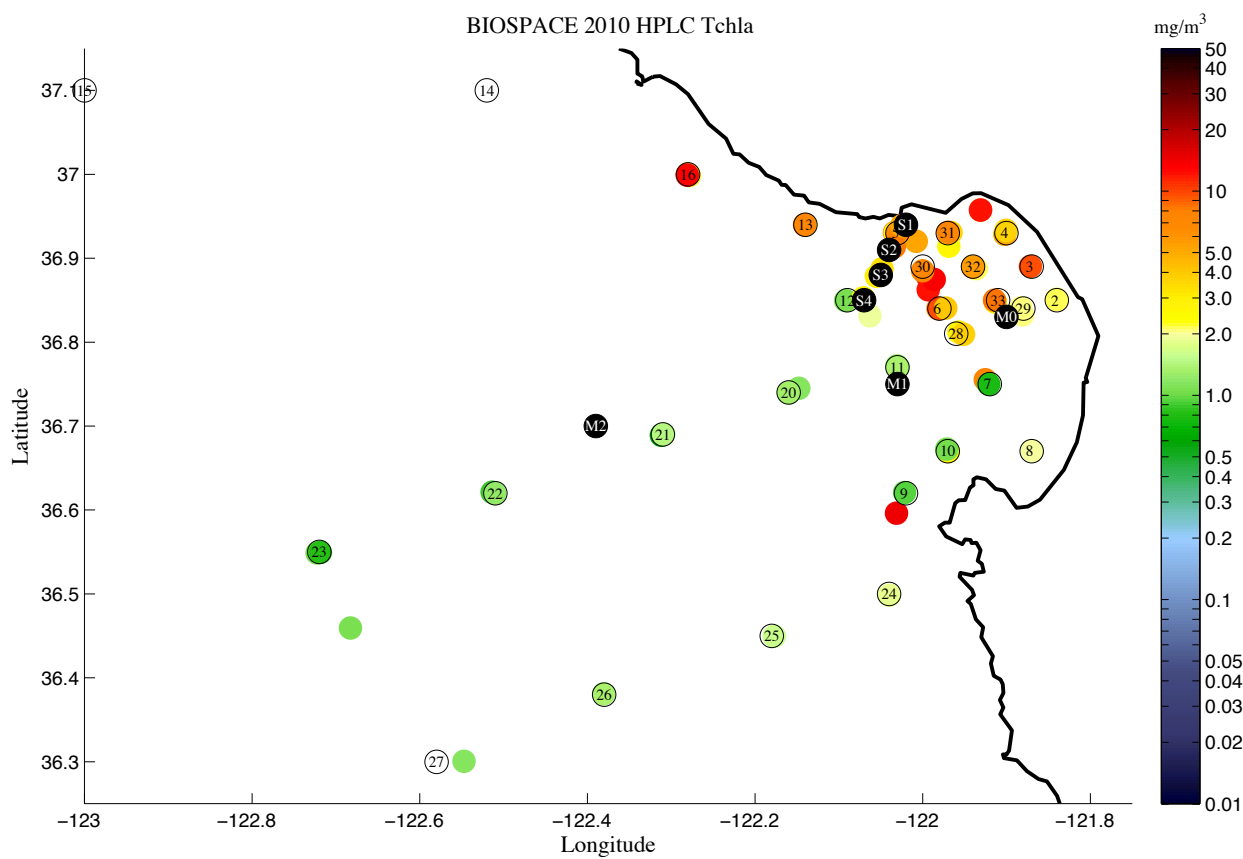
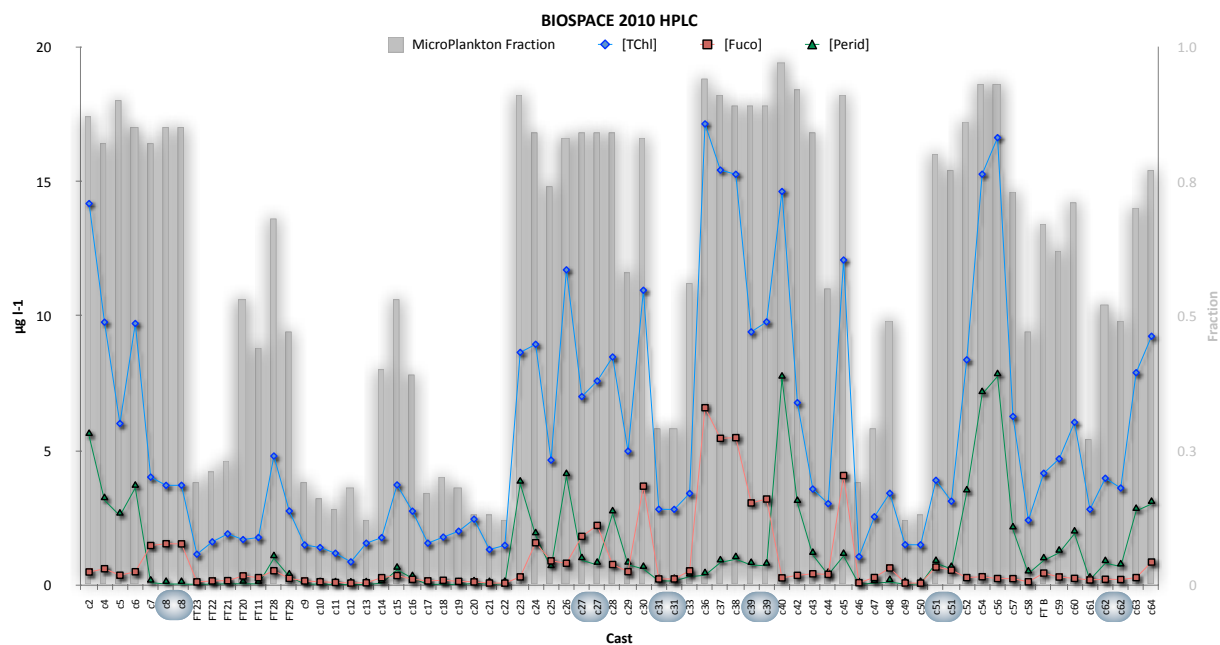
NRL Aircraft Flight Paths

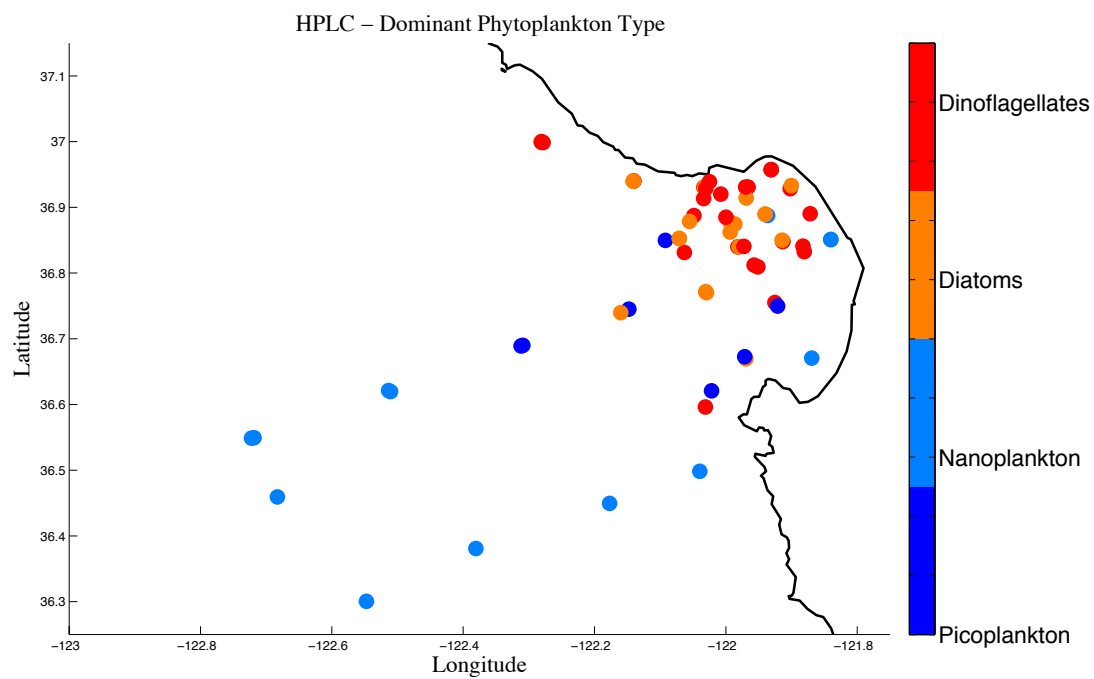


Winds and Upwelling Timeseries

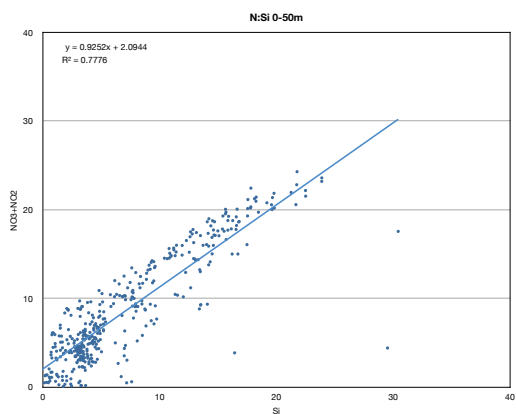
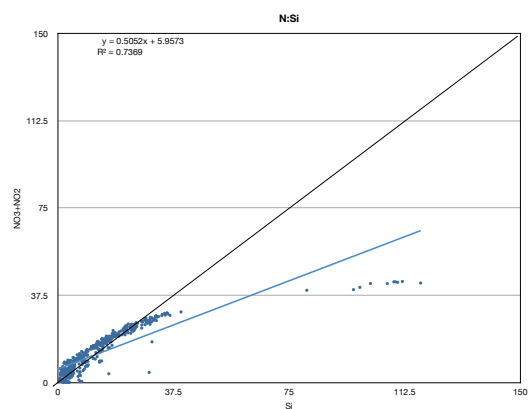
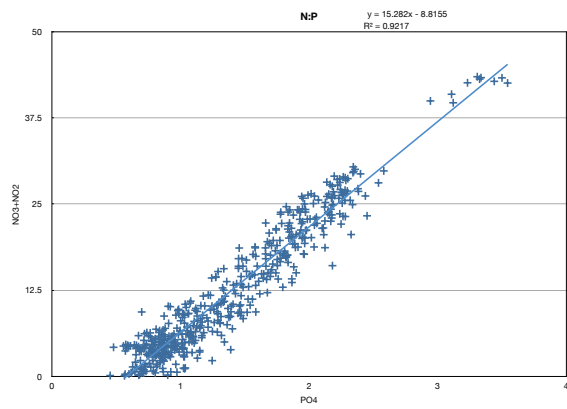


HPLC Summary

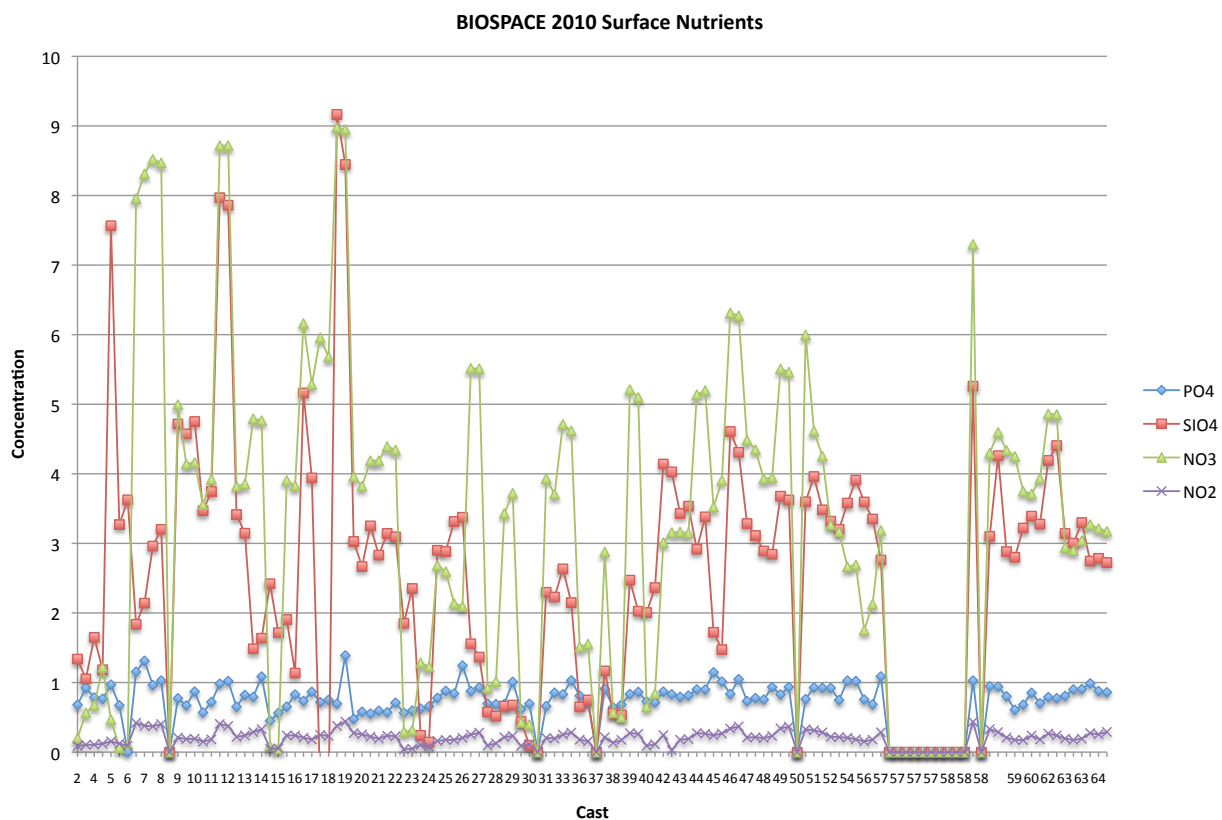




Nutrient Ratios



Surface Nutrient Timeseries



SUMMARY BIOSPACE CRUISE 2010

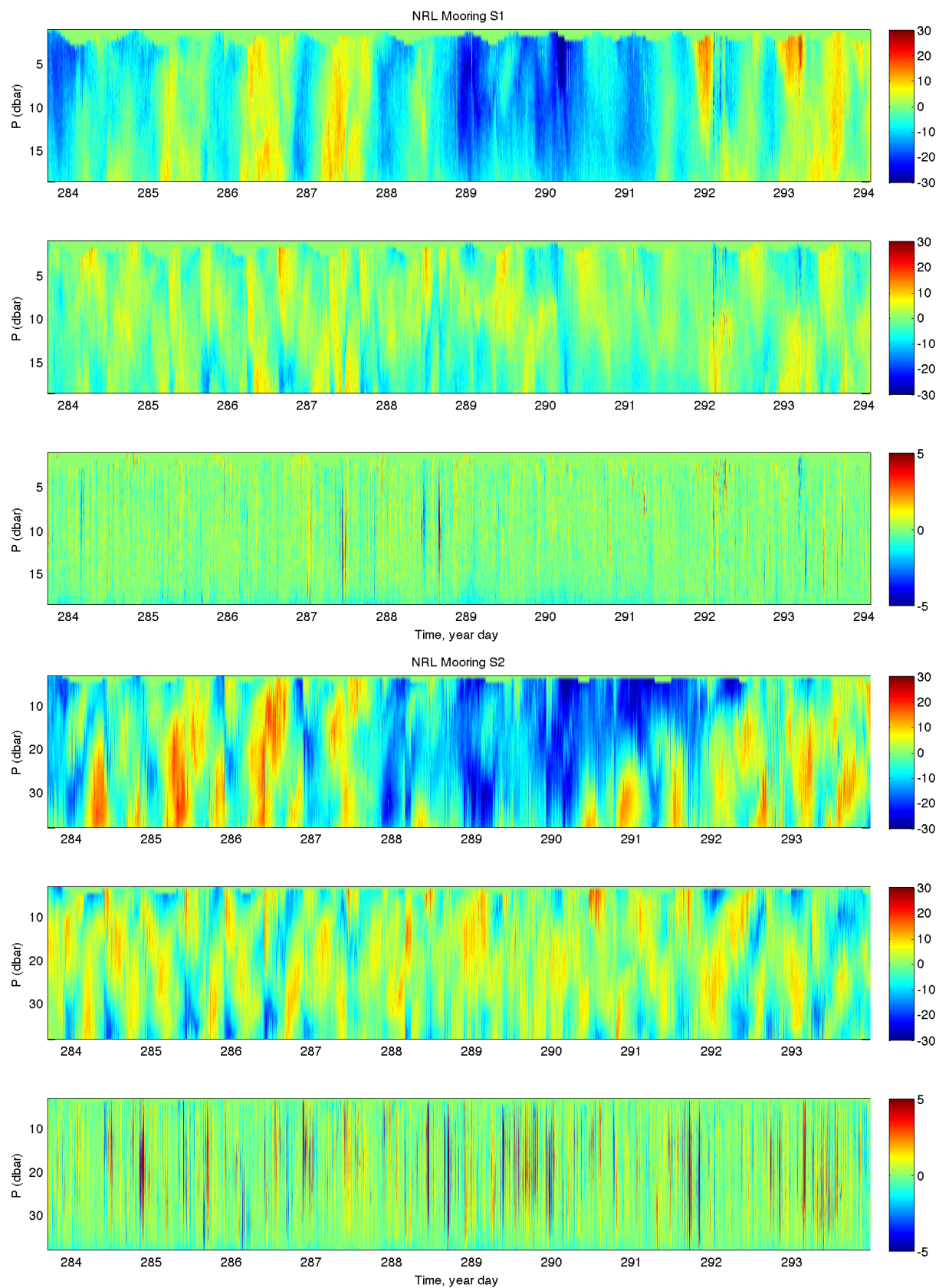
Ocean Color Overflight Predictions

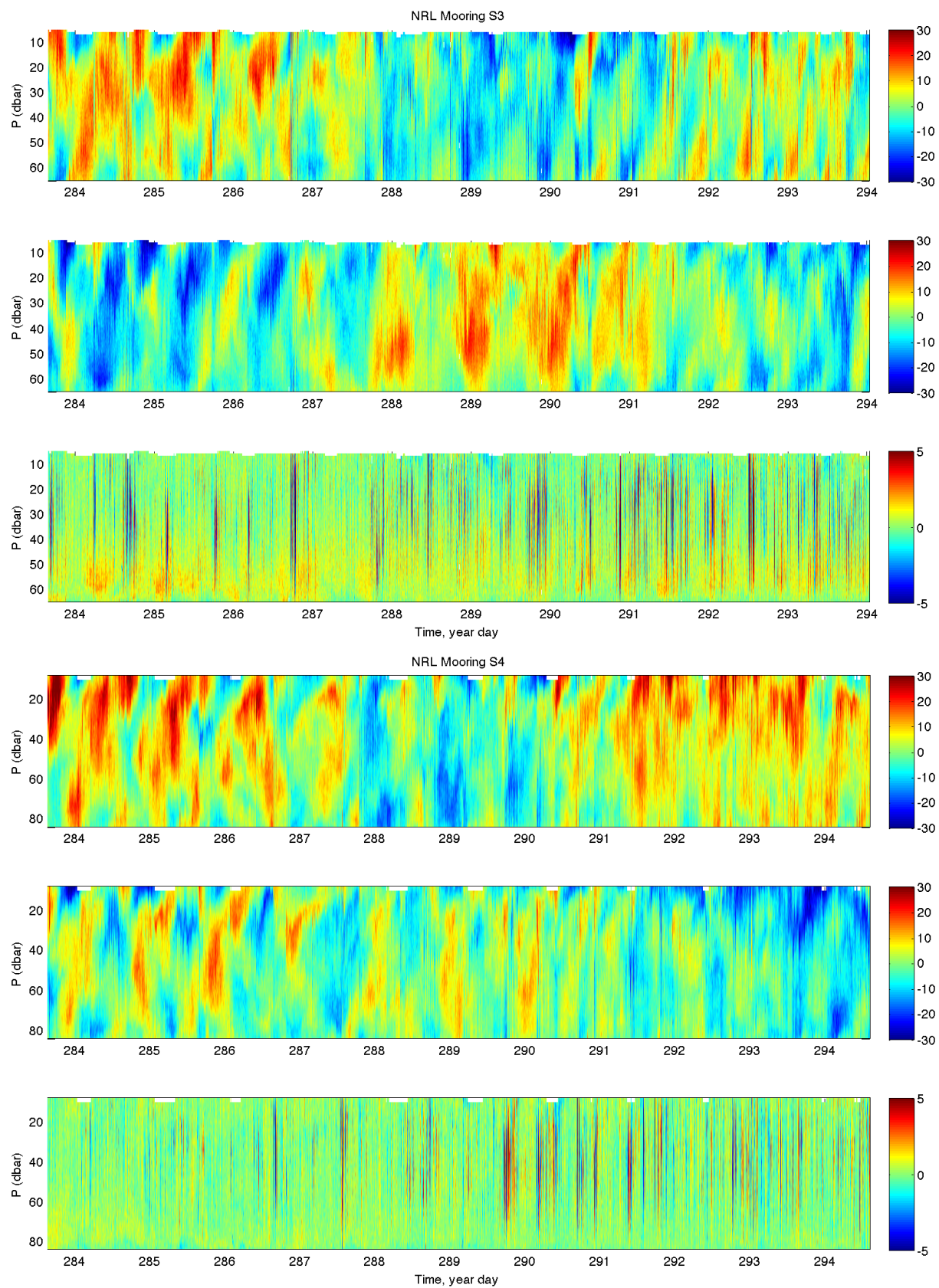
(obtained 4-Oct-2010)

Date/Time (UTC*)	MODIS Aqua	MERIS	SEAWIFS	Date/Time (UTC*)	MODIS Aqua	MERIS	SEAWIFS
08 OCT	21:37	17:52	00:13 22:02 23:41	16 OCT	20:48	18:40	21:11 22:51
09 OCT	20:42 22:20	19:00	21:31 23:10	17 OCT	21:31	18:09	22:20 23:59
10 OCT	21:24	18:29	21:00 22:39	18 OCT	20:36 22:14		21:48 23:28
11 OCT	20:30 22:07	17:57	00:19 22:08 23:47	19 OCT	21:18	18:46	21:17 22:57
12 OCT	21:12	19:05	21:37 23:16	20 OCT	20:24	18:14	22:25
13 OCT	20:17 21:55	18:34	21:06 22:45	21 OCT	21:06	17:43	00:05 21:54 23:33
14 OCT	21:00	18:03	00:24 22:14 23:53	22 OCT	20:11	18:52	21:23 23:02
15 OCT	20:05 21:42		21:42 23:22	23 OCT	20:54	18:20	22:31

*Local time (PDT) = UTC - 7

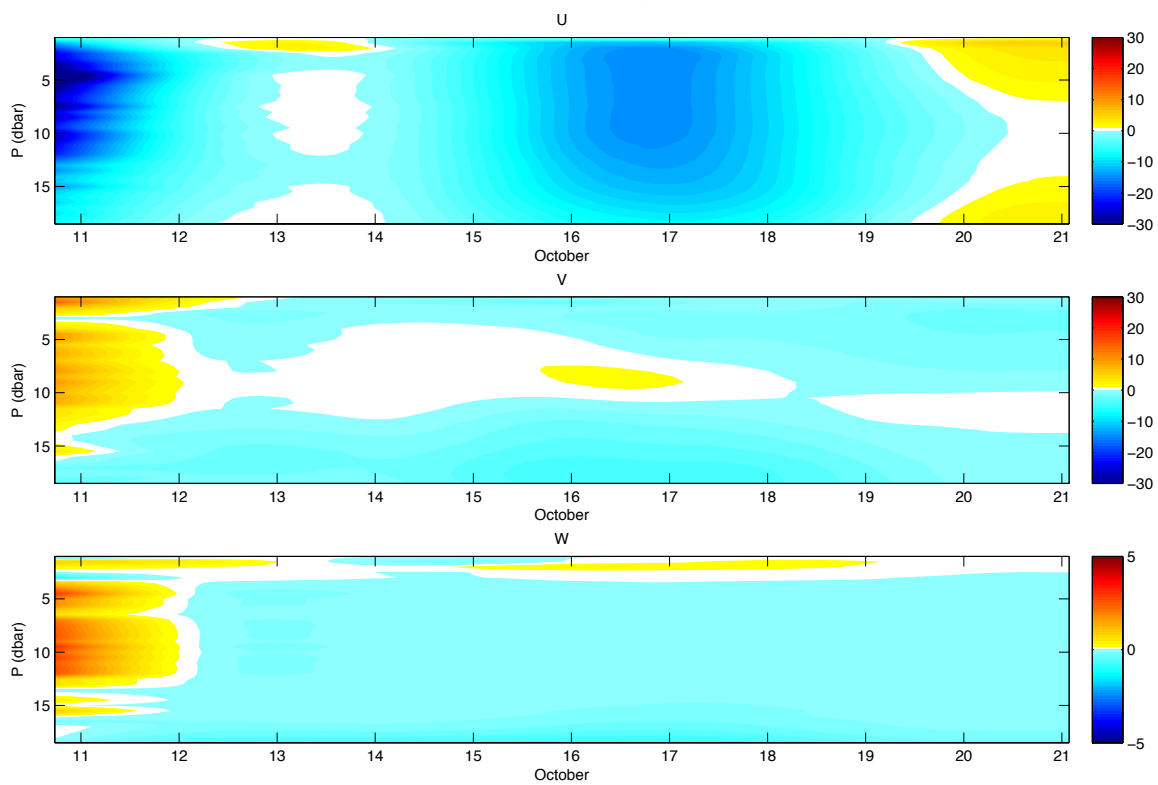
NRL Barney Moorings Timeseries



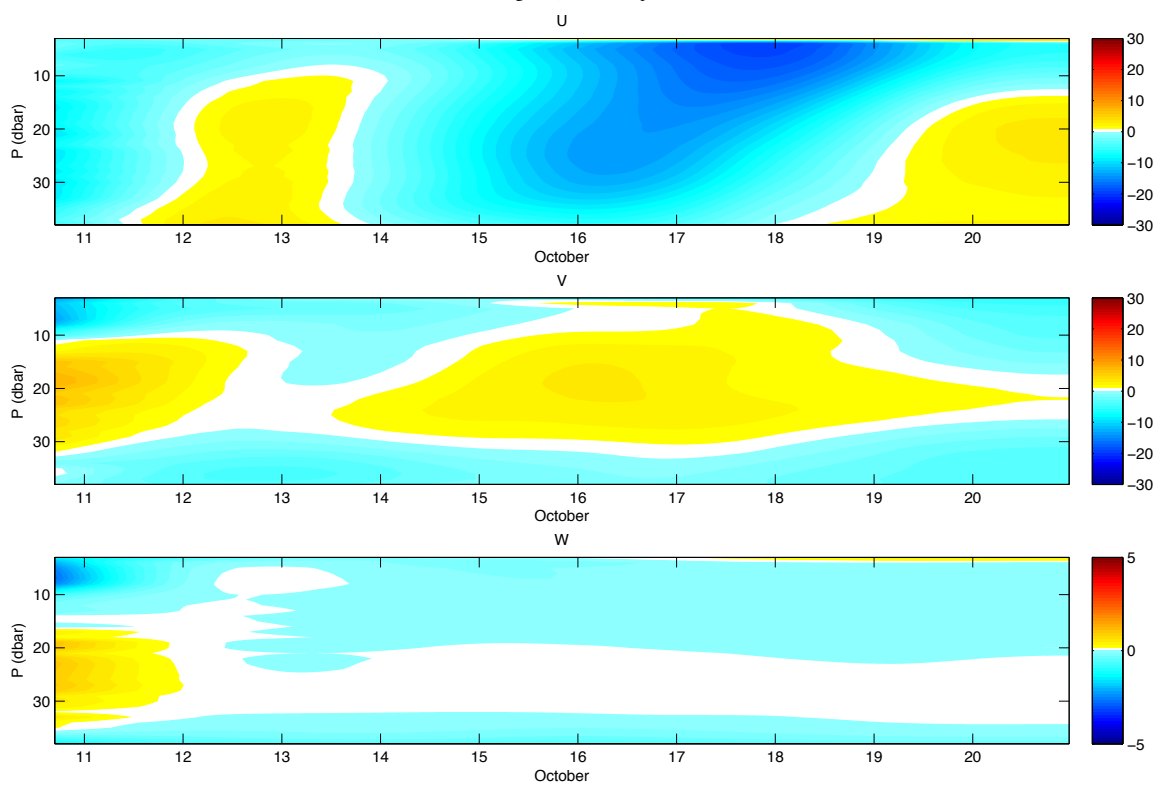


NRL Barney Moorings Timeseries (low pass filtered)

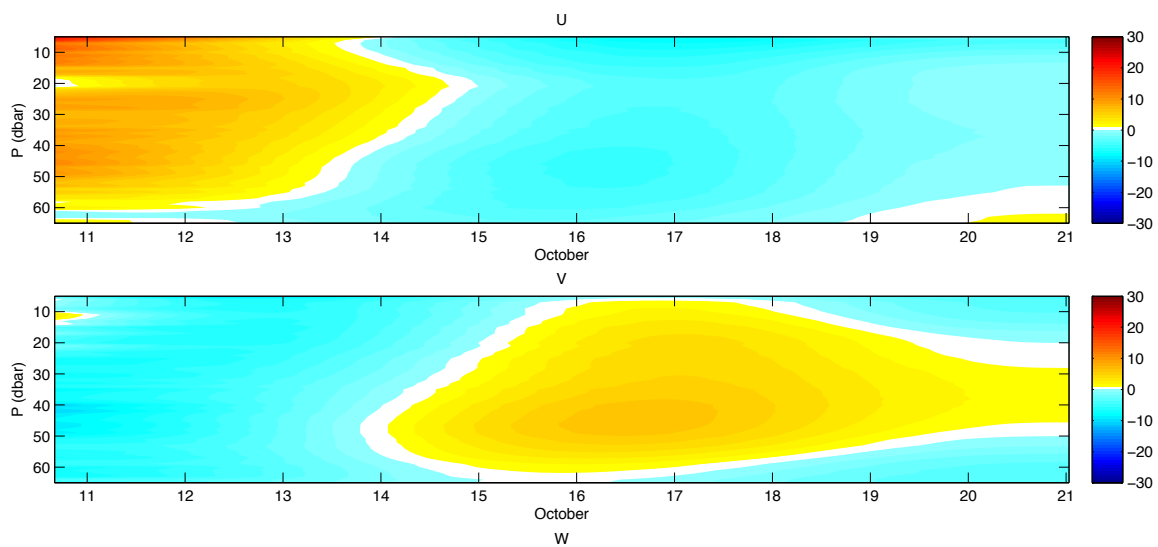
NRL Mooring S1 (50 hr low-pass filtered)



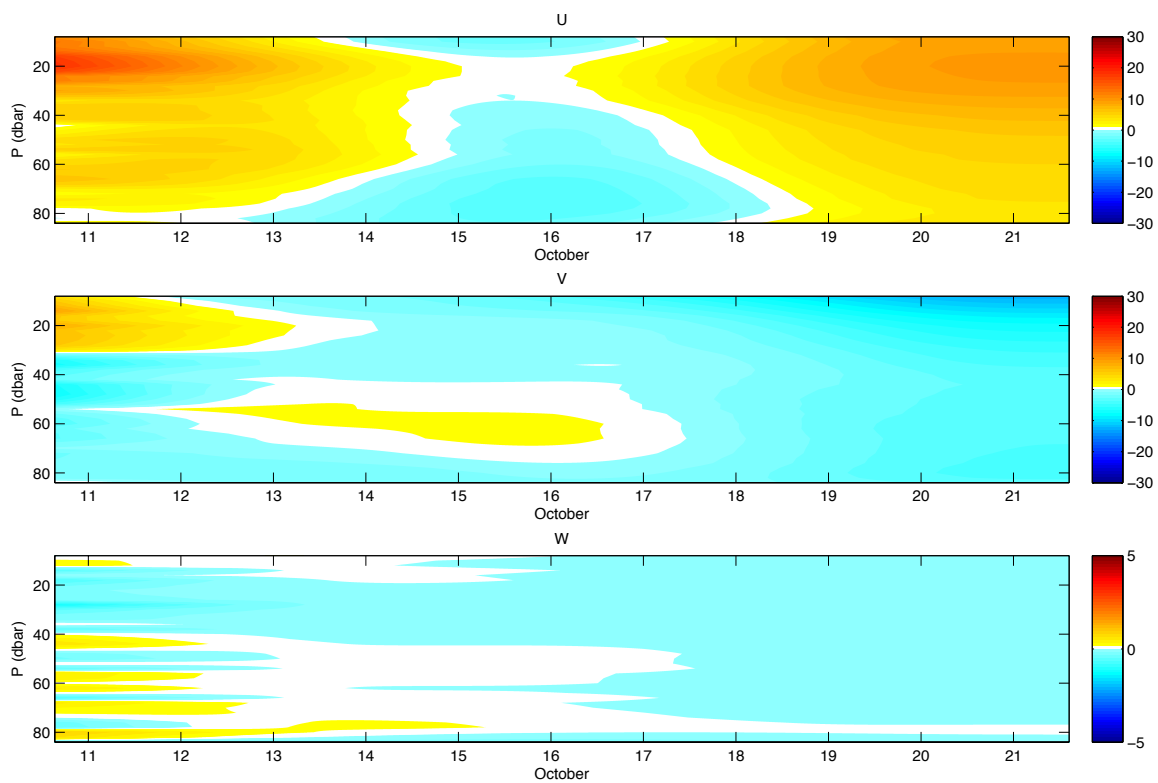
NRL Mooring S2 (50 hr low-pass filtered)



NRL Mooring S3 (50 hr low-pass filtered)

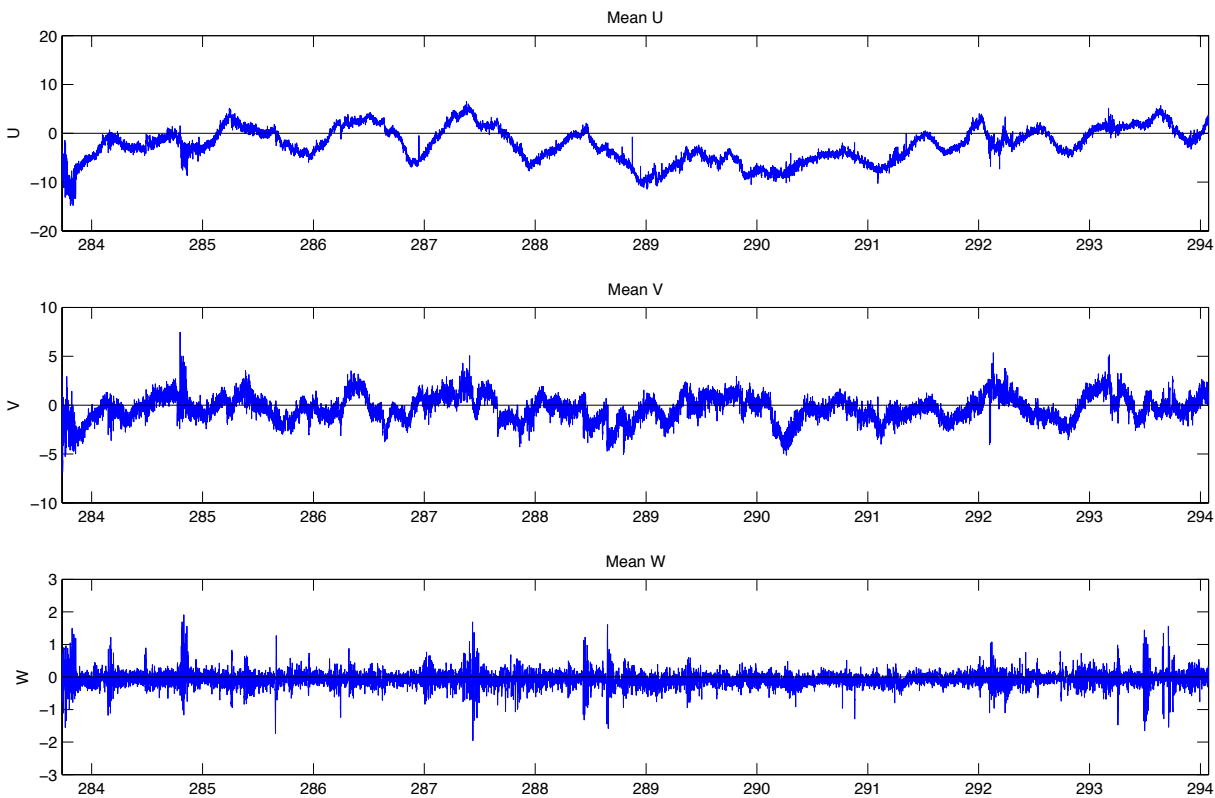


NRL Mooring S4 (50 hr low-pass filtered)

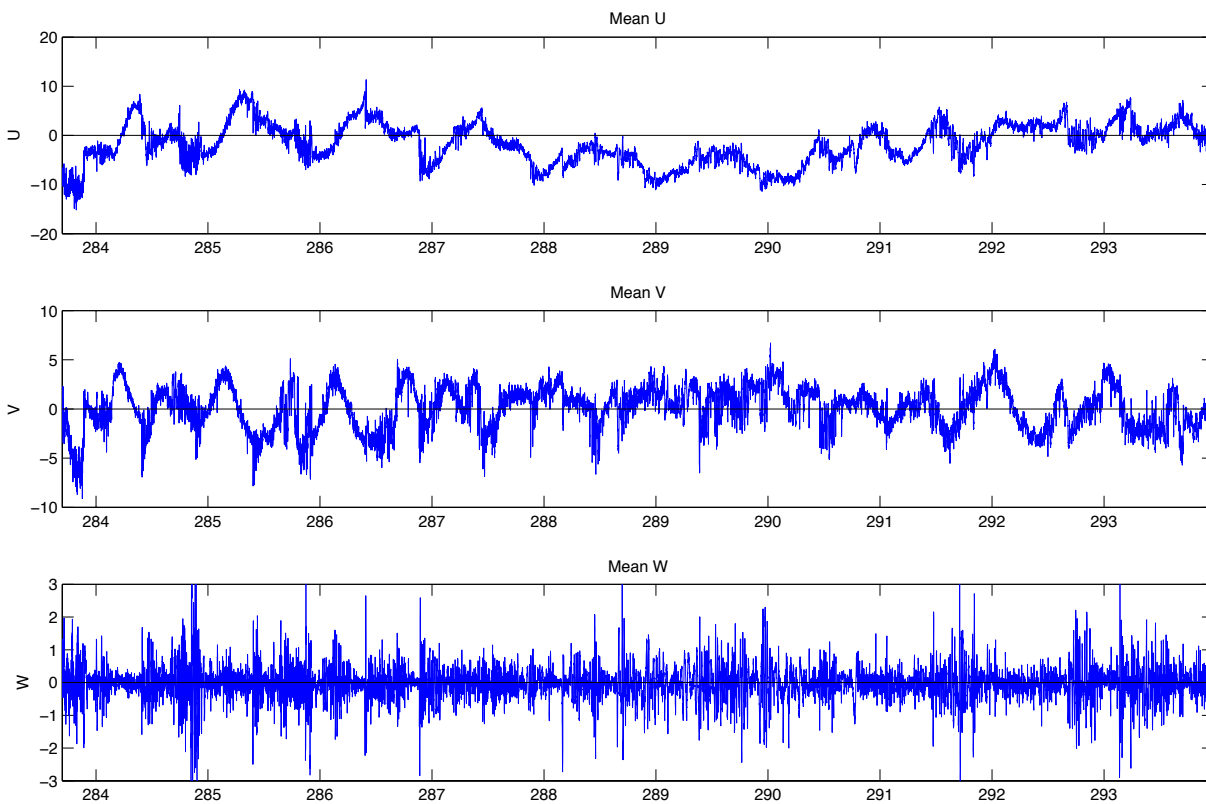


NRL Barney Moorings Depth Integrated Timeseries

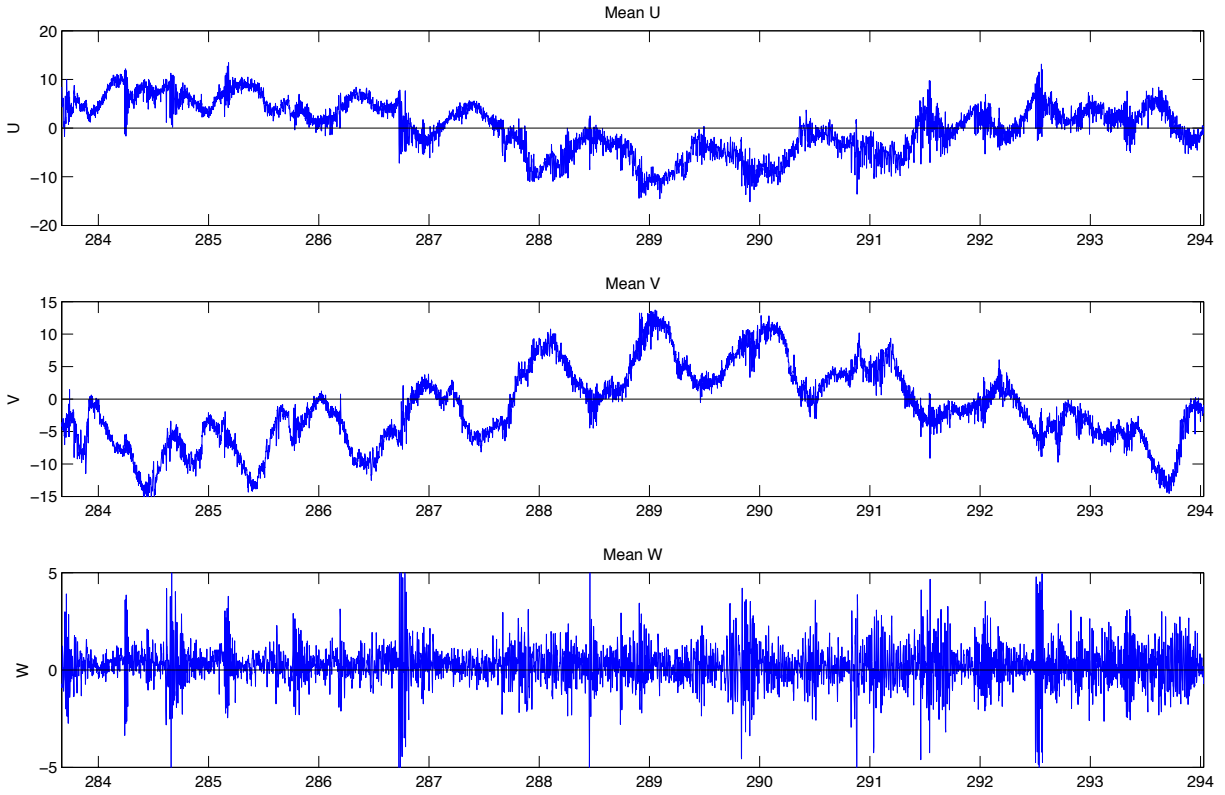
NRL Mooring S1 mean (33 hr low-pass filtered)



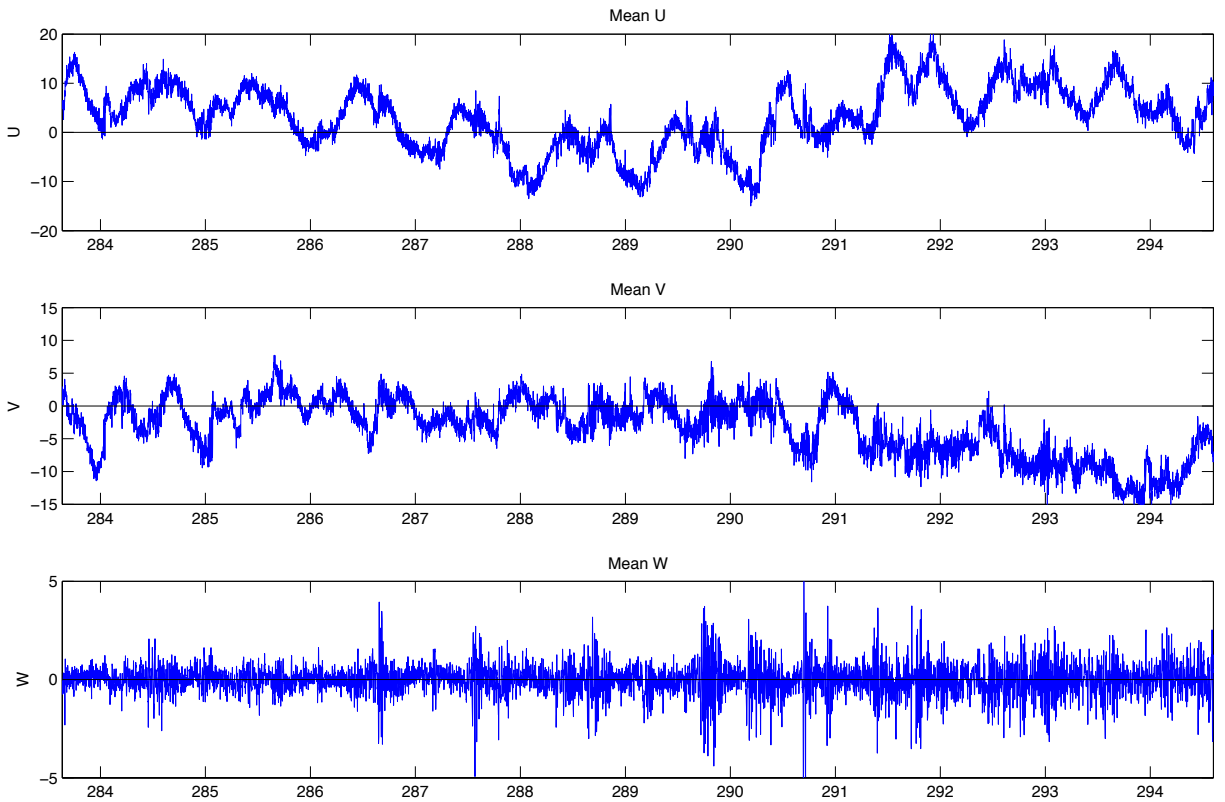
NRL Mooring S2 mean (33 hr low-pass filtered)



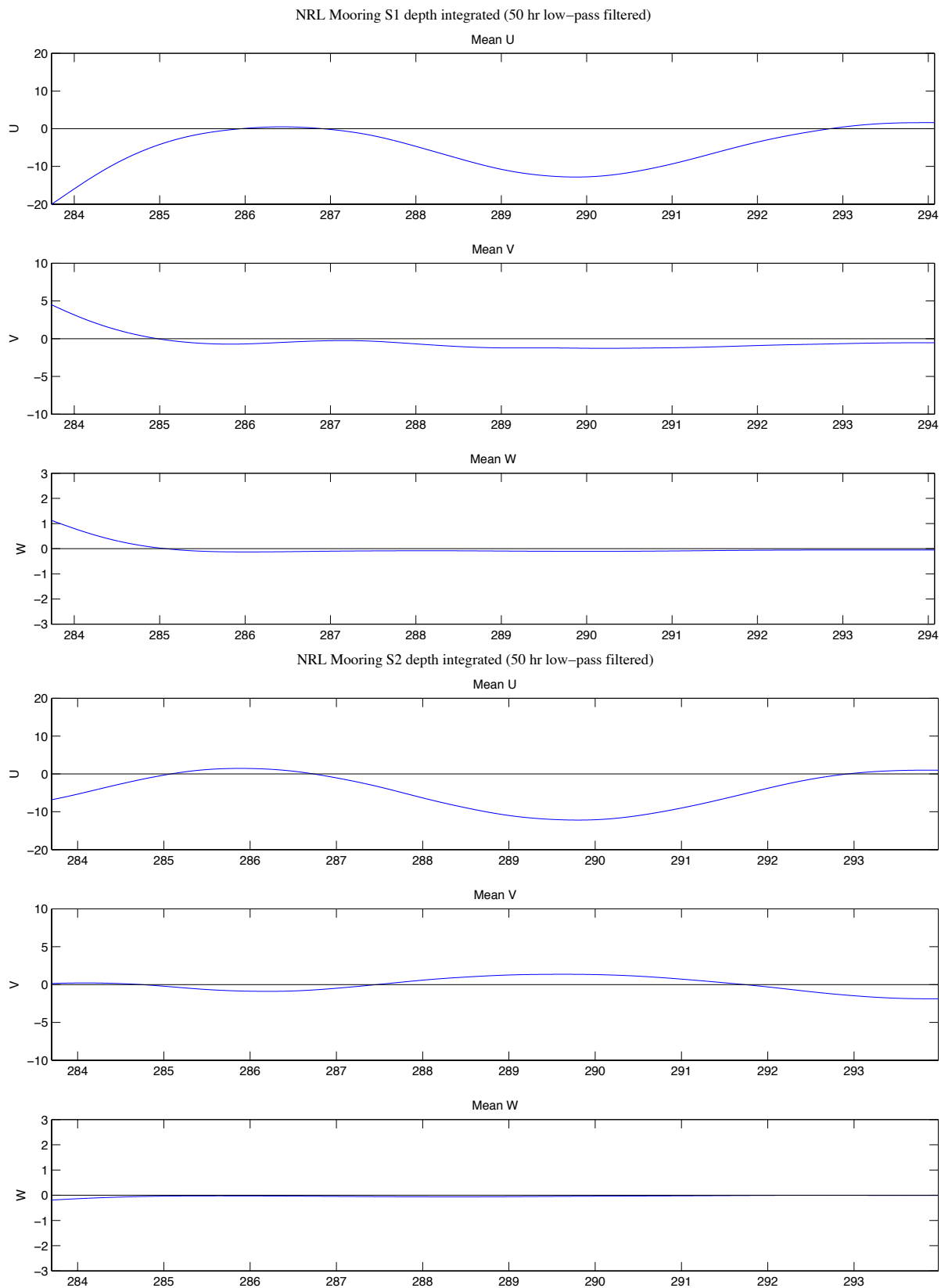
NRL Mooring S3 mean (33 hr low-pass filtered)



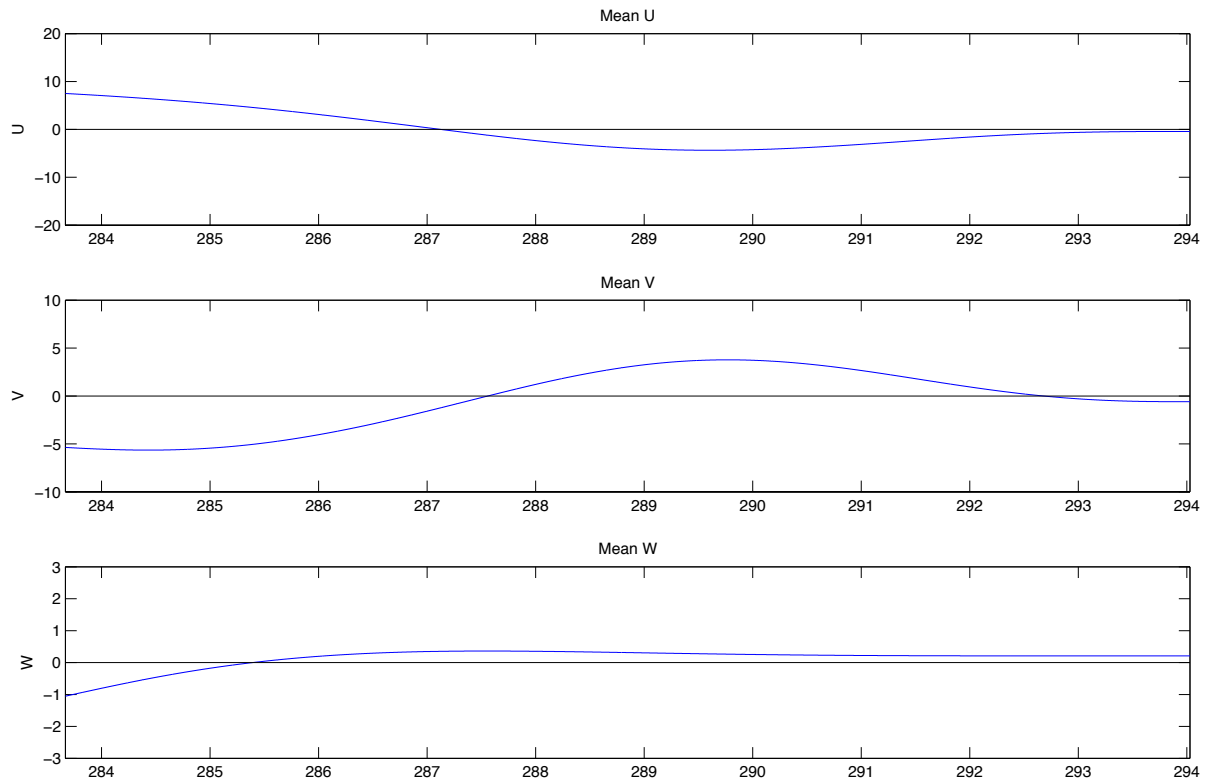
NRL Mooring S4 mean (33 hr low-pass filtered)



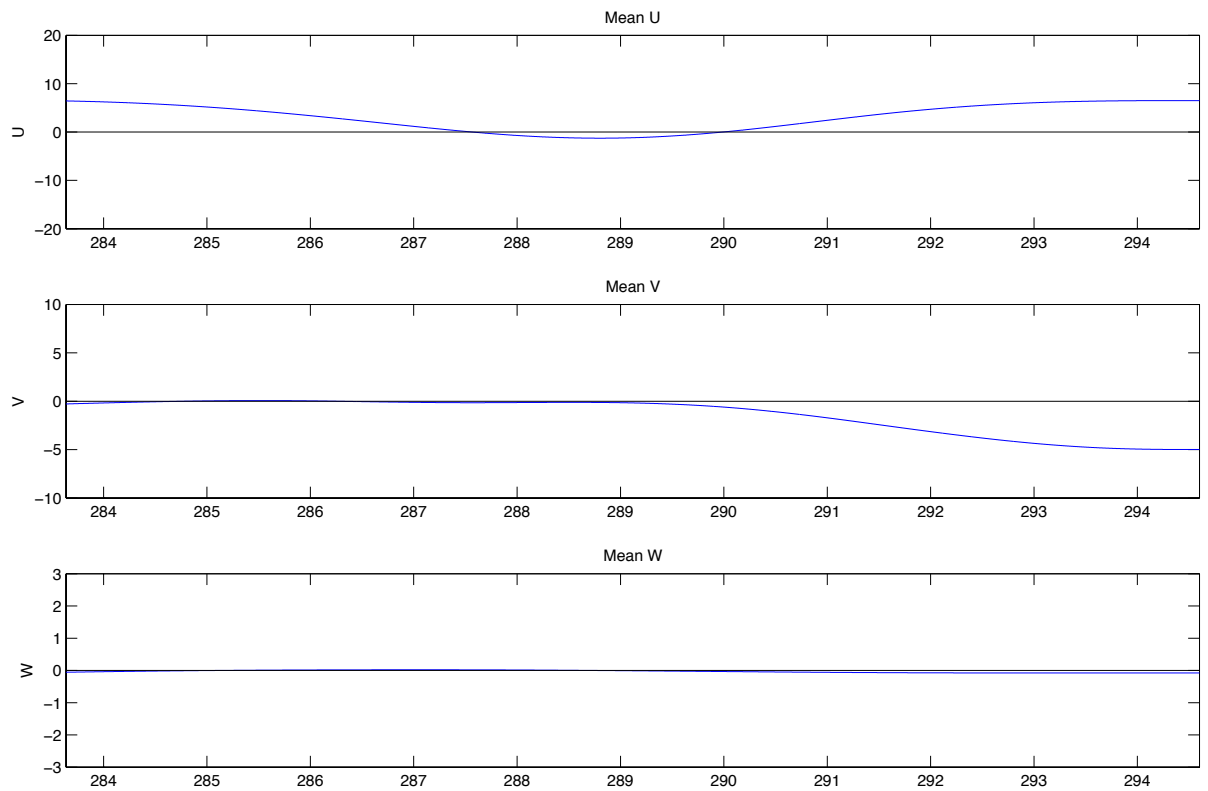
Depth-Integrated, Low-pass Filtered Currents at NRL Moorings



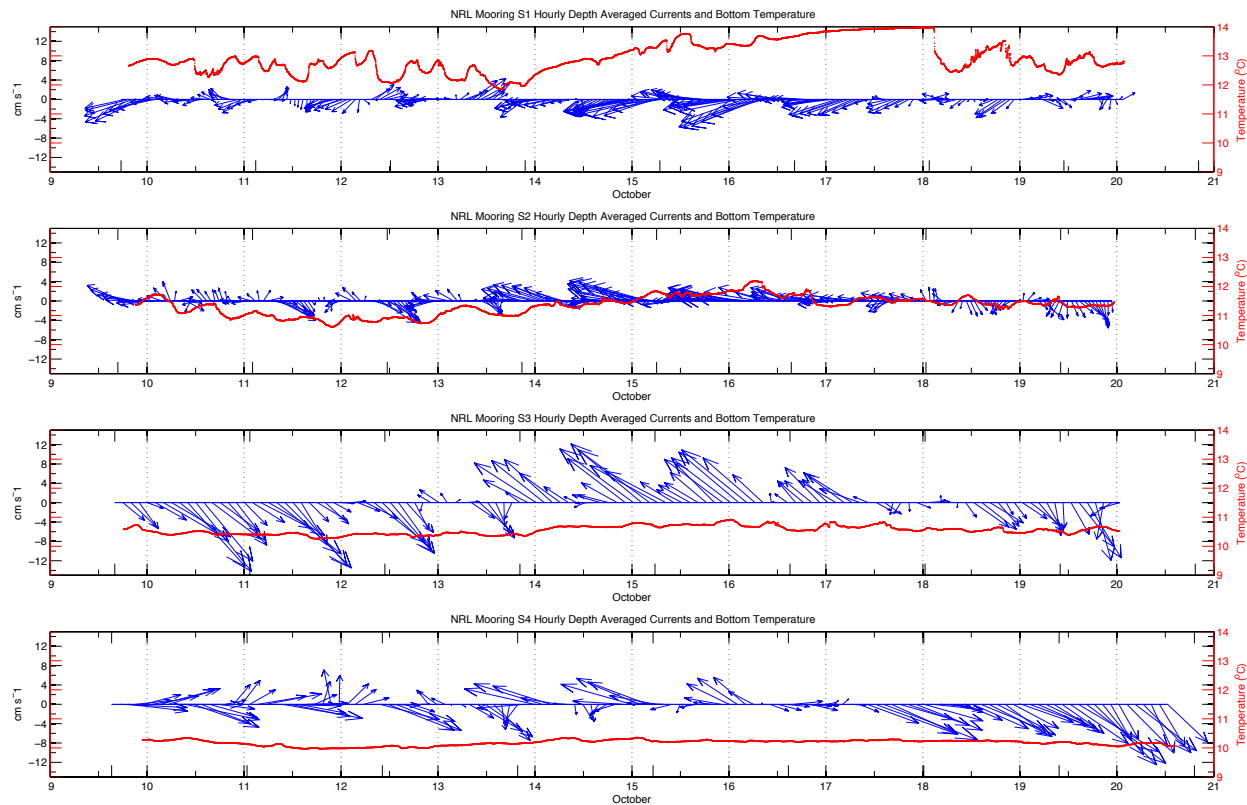
NRL Mooring S3 depth integrated (50 hr low-pass filtered)



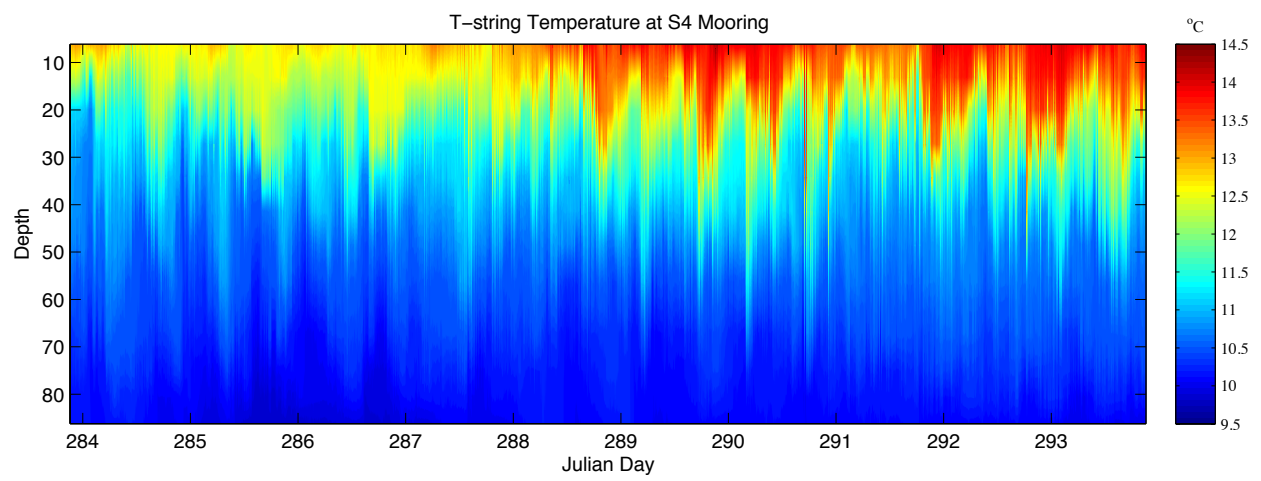
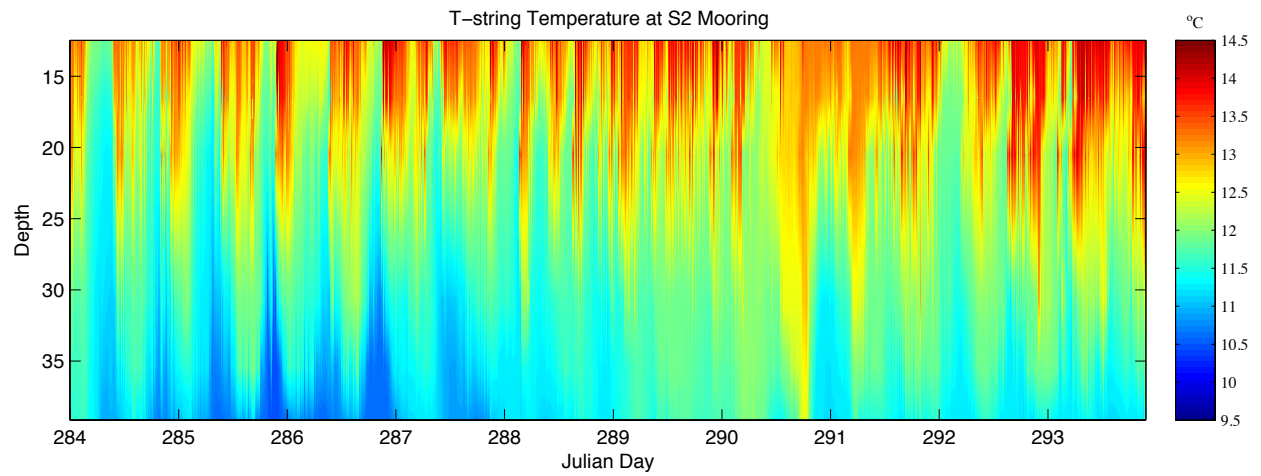
NRL Mooring S4 depth integrated (50 hr low-pass filtered)



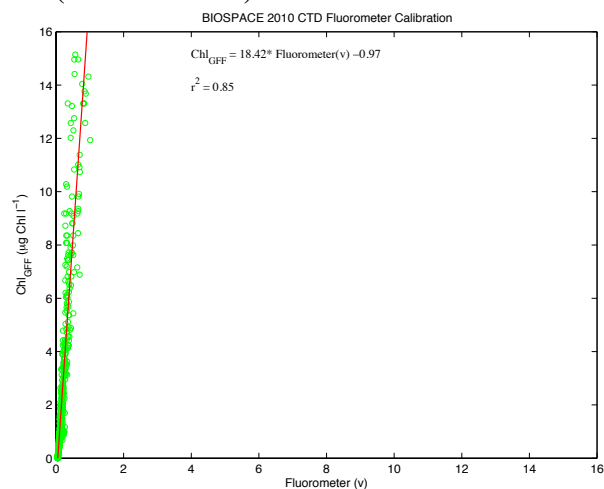
Hourly Depth Averaged Current Vectors and Bottom Temperature at NRL Moorings



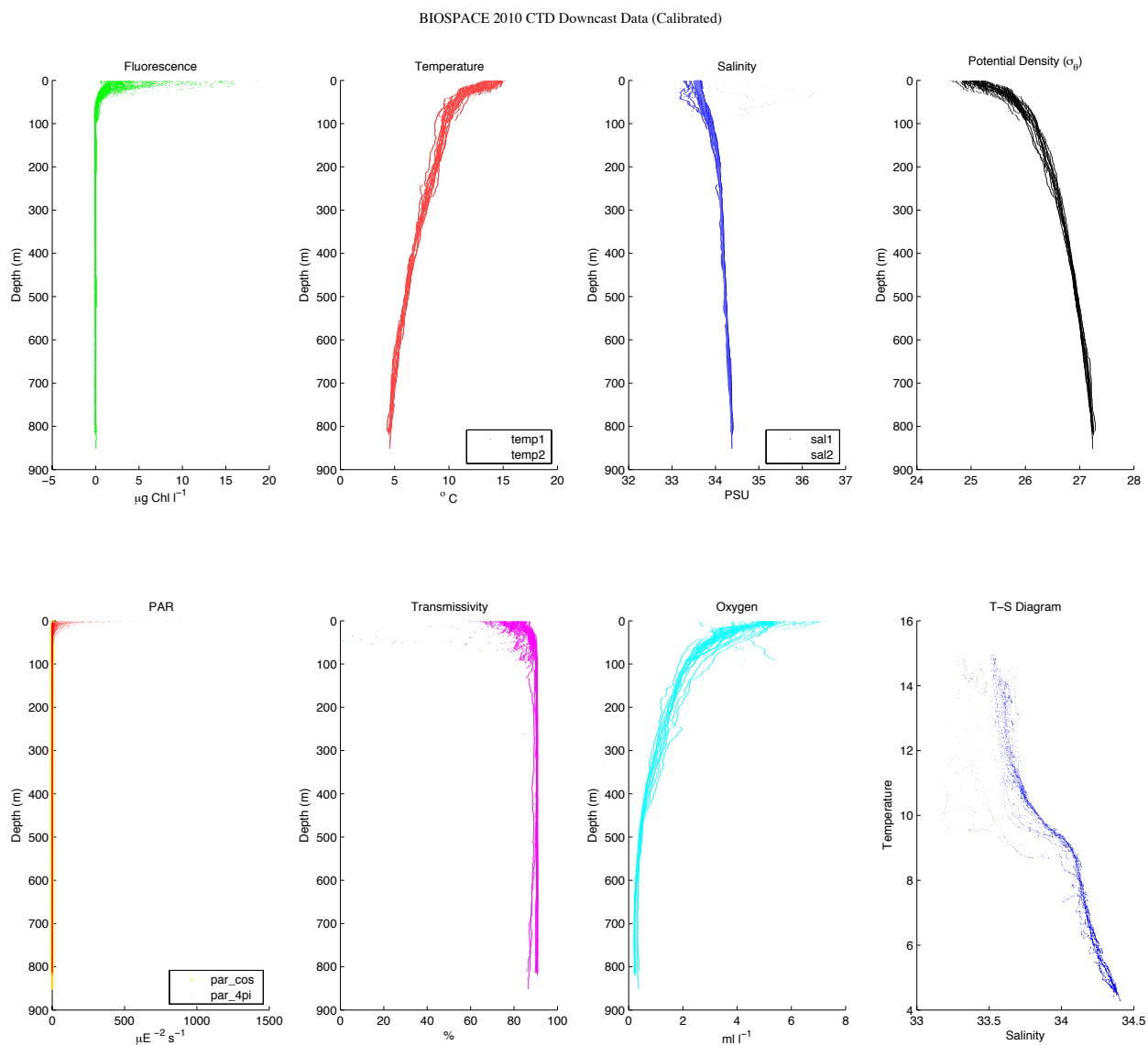
T-string Temperature Timeseries (S2 and S4)



Calibration of CTD fluorometer (with bottle data)

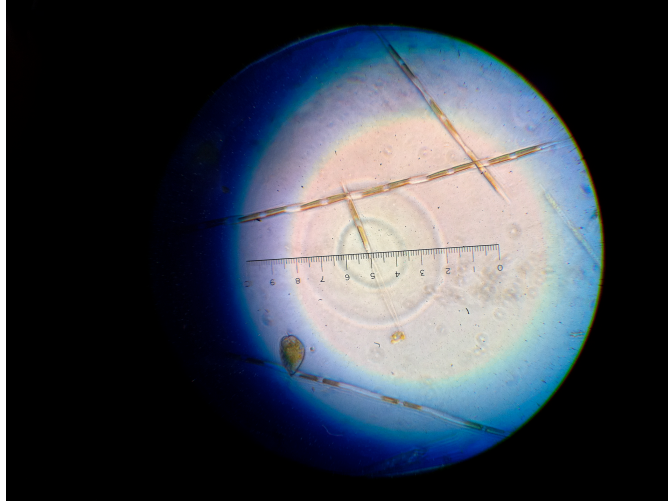


Composite plot of CTD downcast data

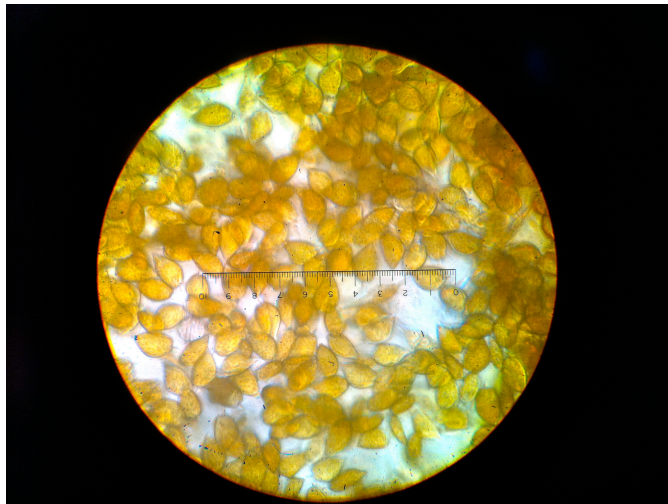


Microscope Images

Pseudo-nitzschia



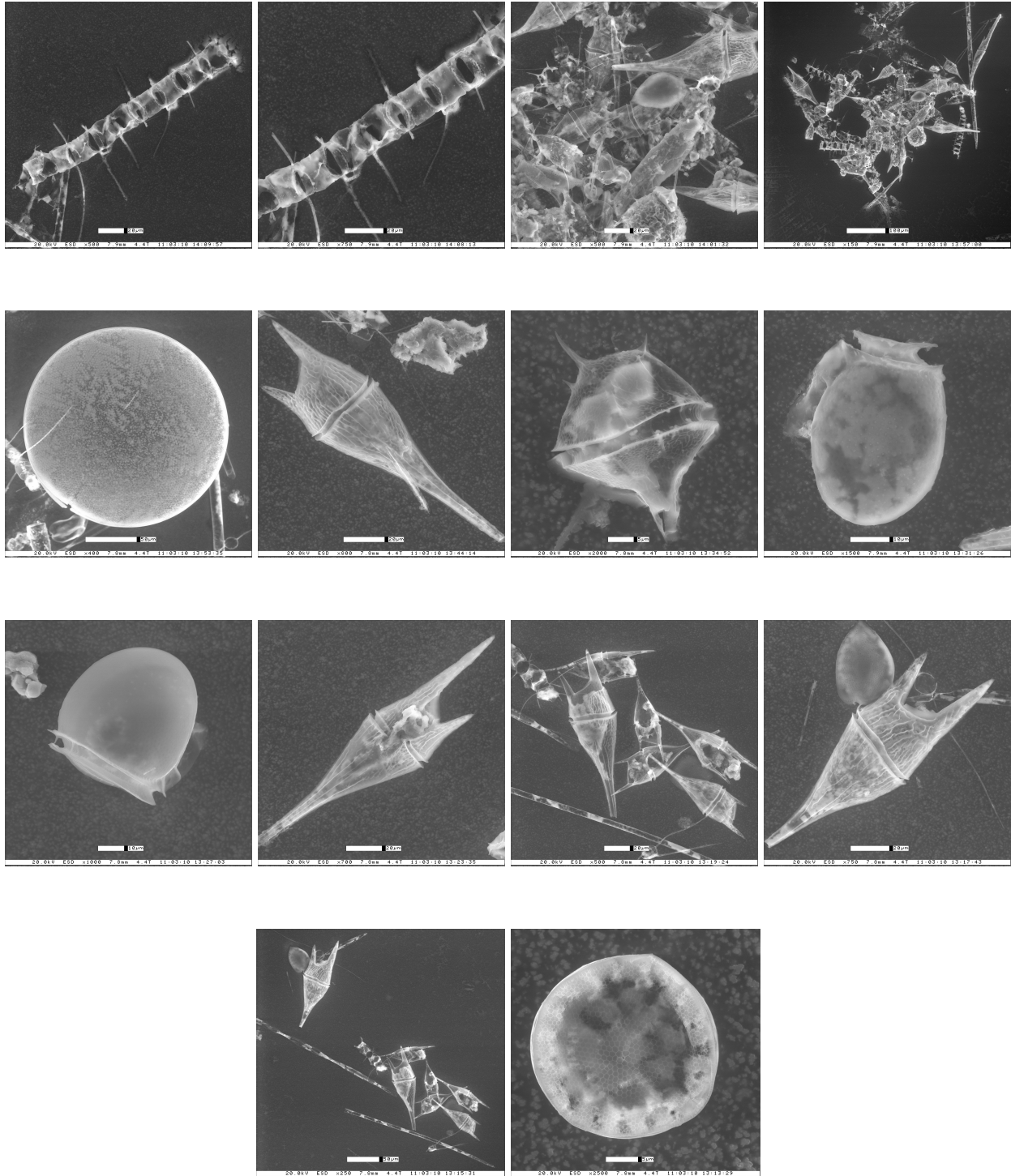
Prorocentrum micans



Mixed Dinoflagellates



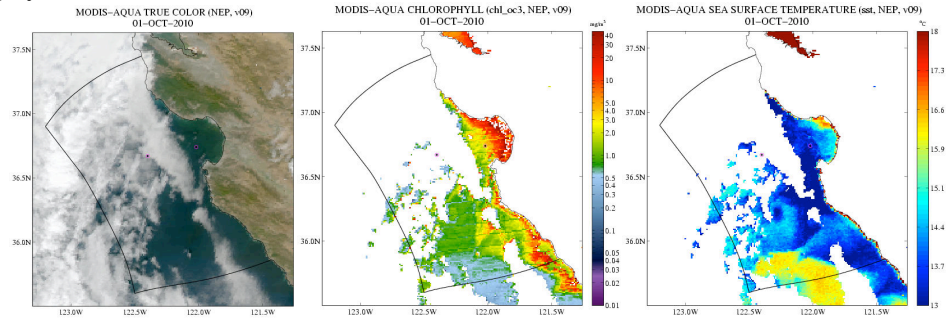
Electron Micrographs



Courtesy of Richard Ray, NRL SSC.

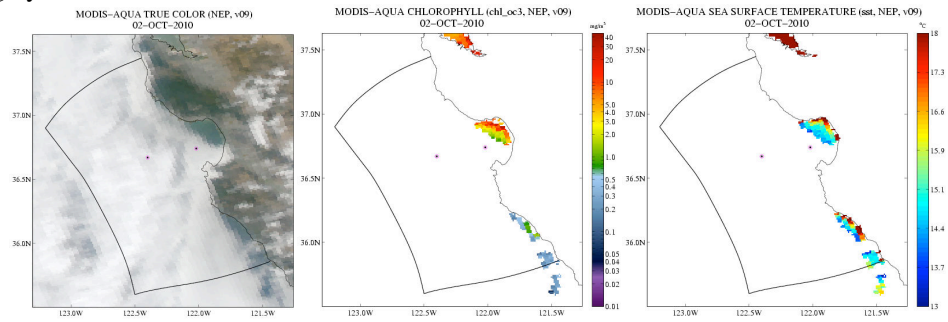
10/01

Satellite Imagery



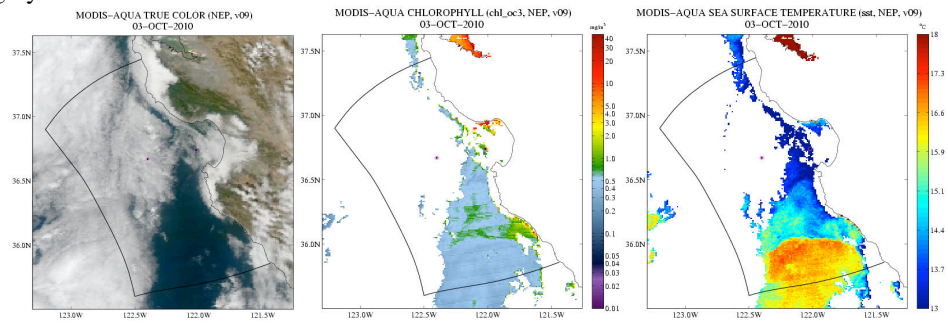
10/02

Satellite Imagery



10/03

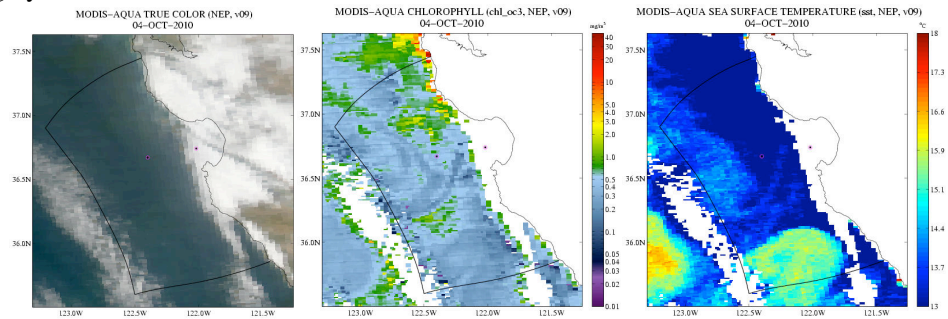
Satellite Imagery



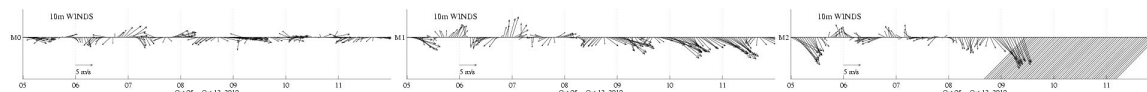
10/04

(upwelling) Pseudo-nitzschianitzschia bloom in north MB

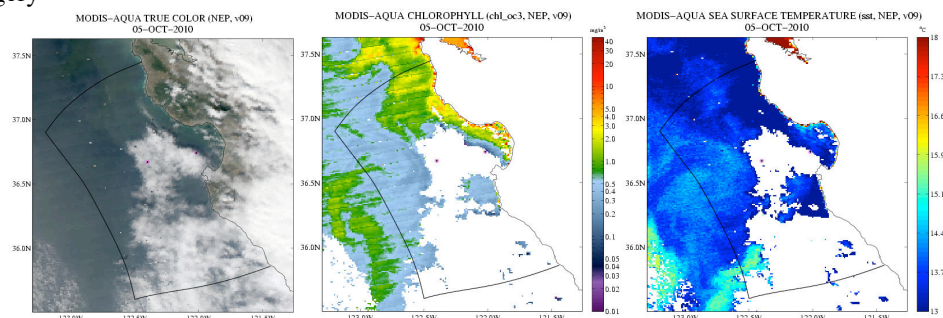
Satellite Imagery



10/05



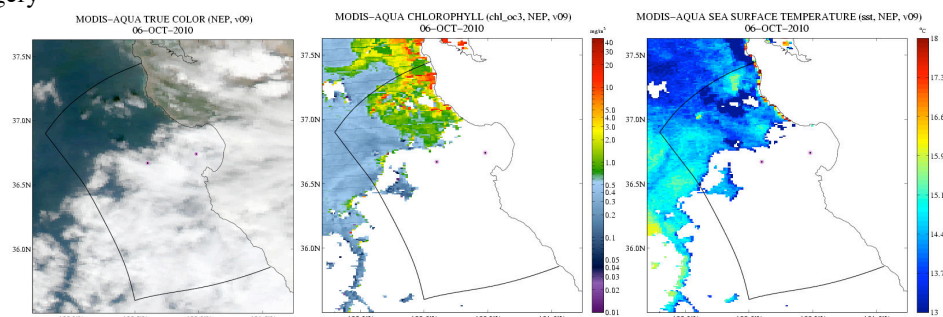
Satellite Imagery



10/06

(relaxation) *Pseudo-nitzschia* bloom sinks

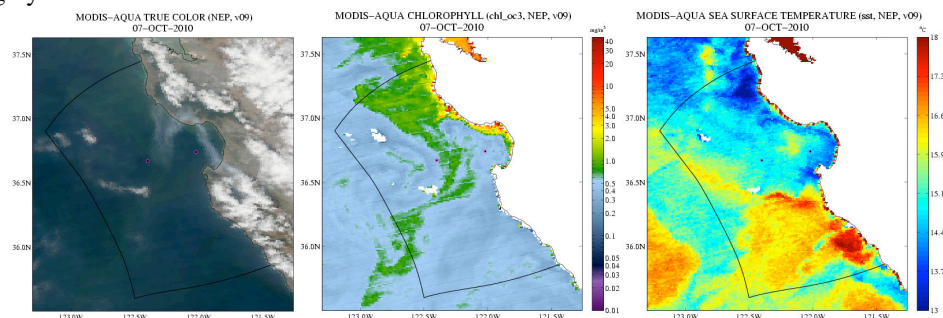
Satellite Imagery



10/07

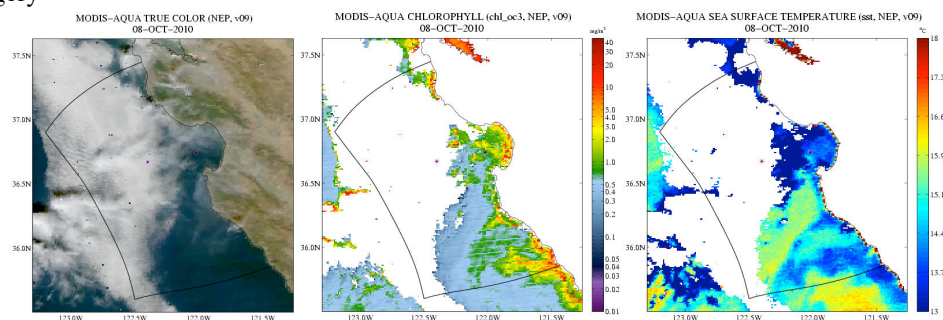
(relaxation) *Prorocentrum micans* bloom at surface in north MB

Satellite Imagery



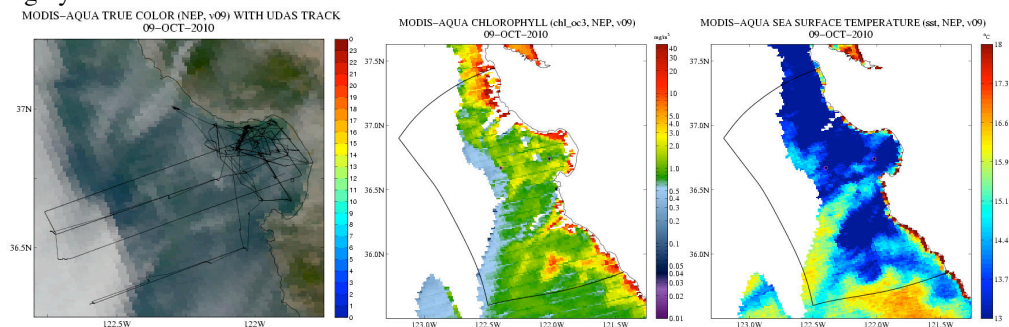
10/08

Satellite Imagery



10/09

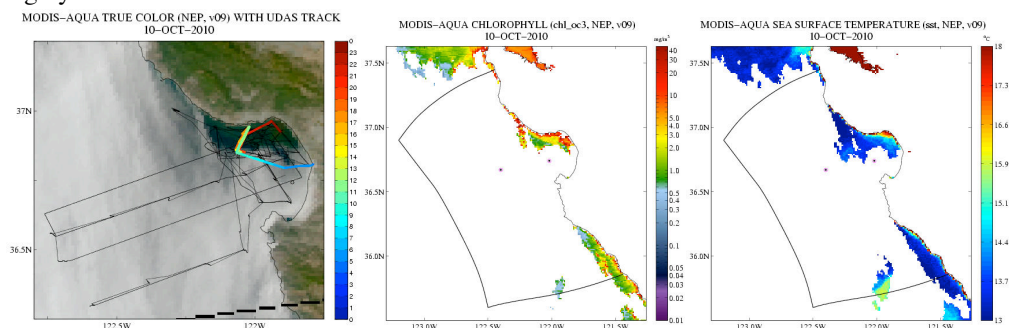
Satellite Imagery



10/10

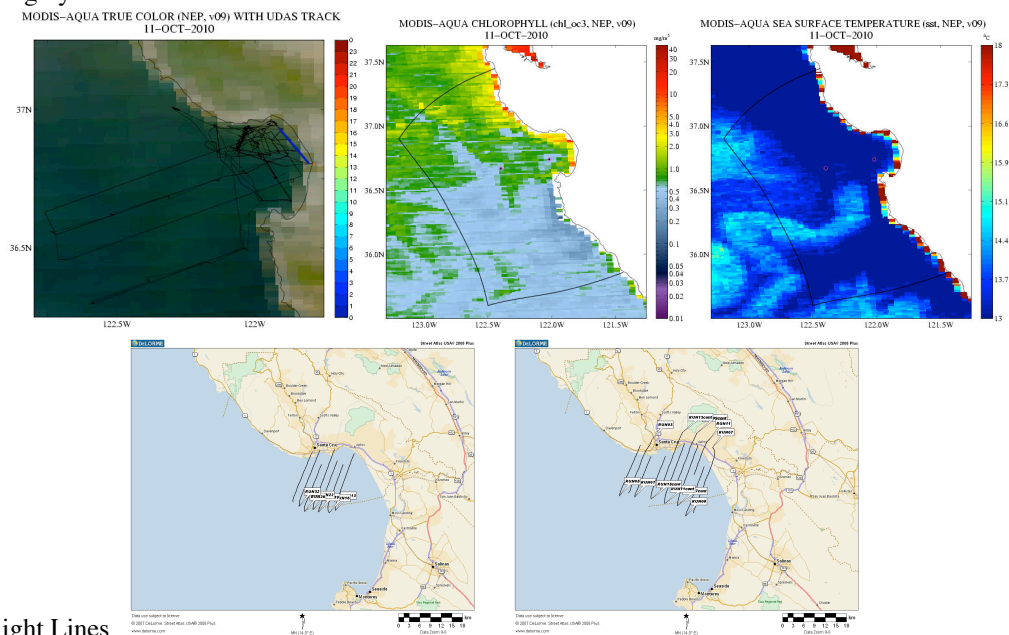
(relaxation) Bloom intensifies in north MB

Satellite Imagery



10/11

Satellite Imagery



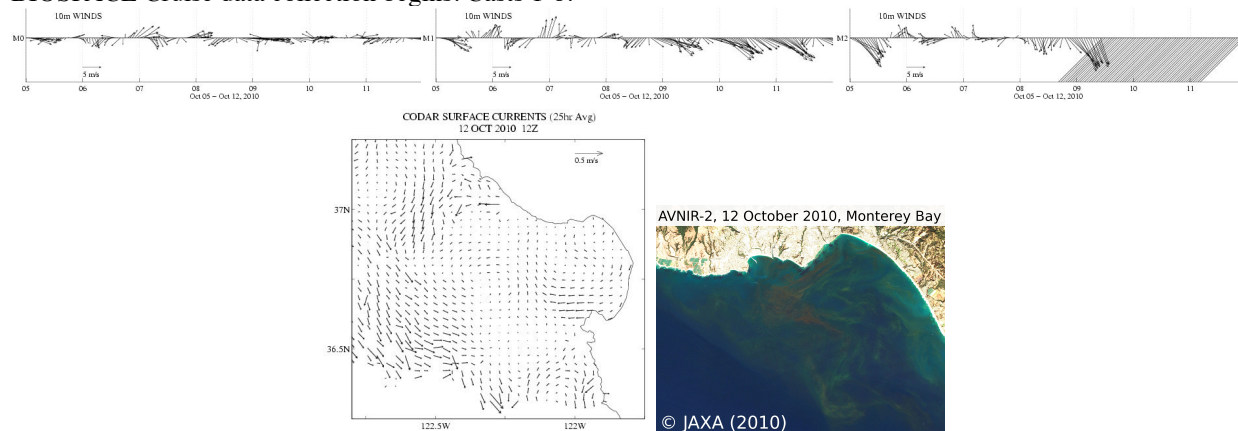
Aircraft Flight Lines

PHILLS Caption: North Bay red plume survey (lines closely spaced and overlapping) Nice clear day. This is the first flight in the area and consists of overlapping flight lines in the North Part of the Bay with the dinoflagellate bloom.

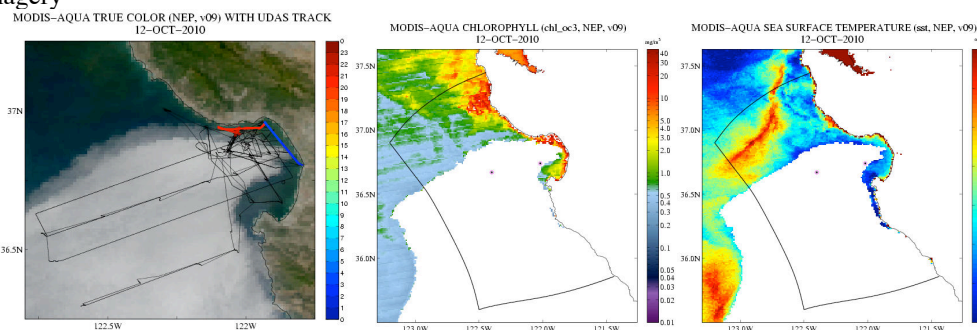
10/12

(relaxation) Bloom spreads further across north MB

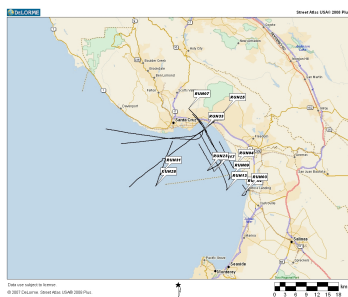
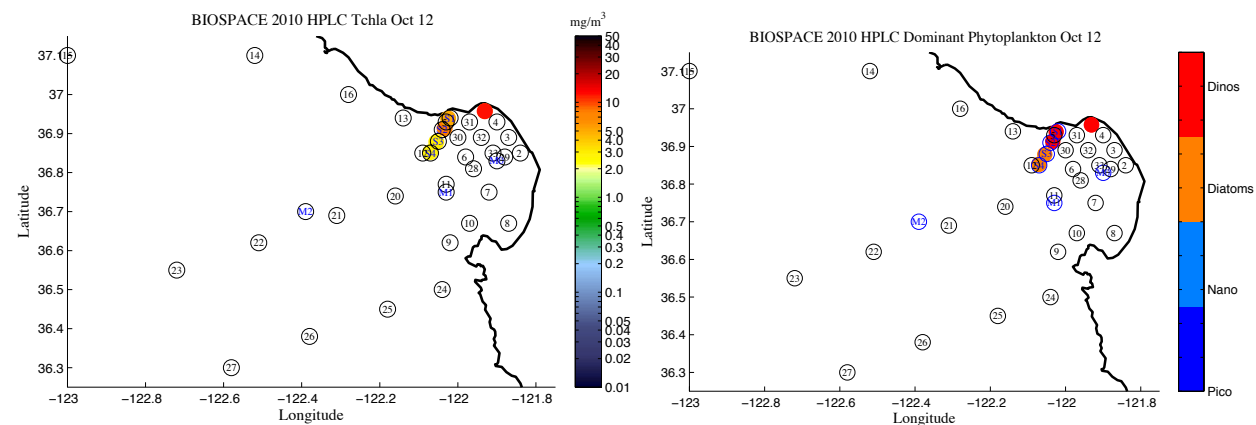
BIOSPACE Cruise data collection begins. Casts 1-8.



Satellite Imagery



HPLC



Aircraft Flight-lines

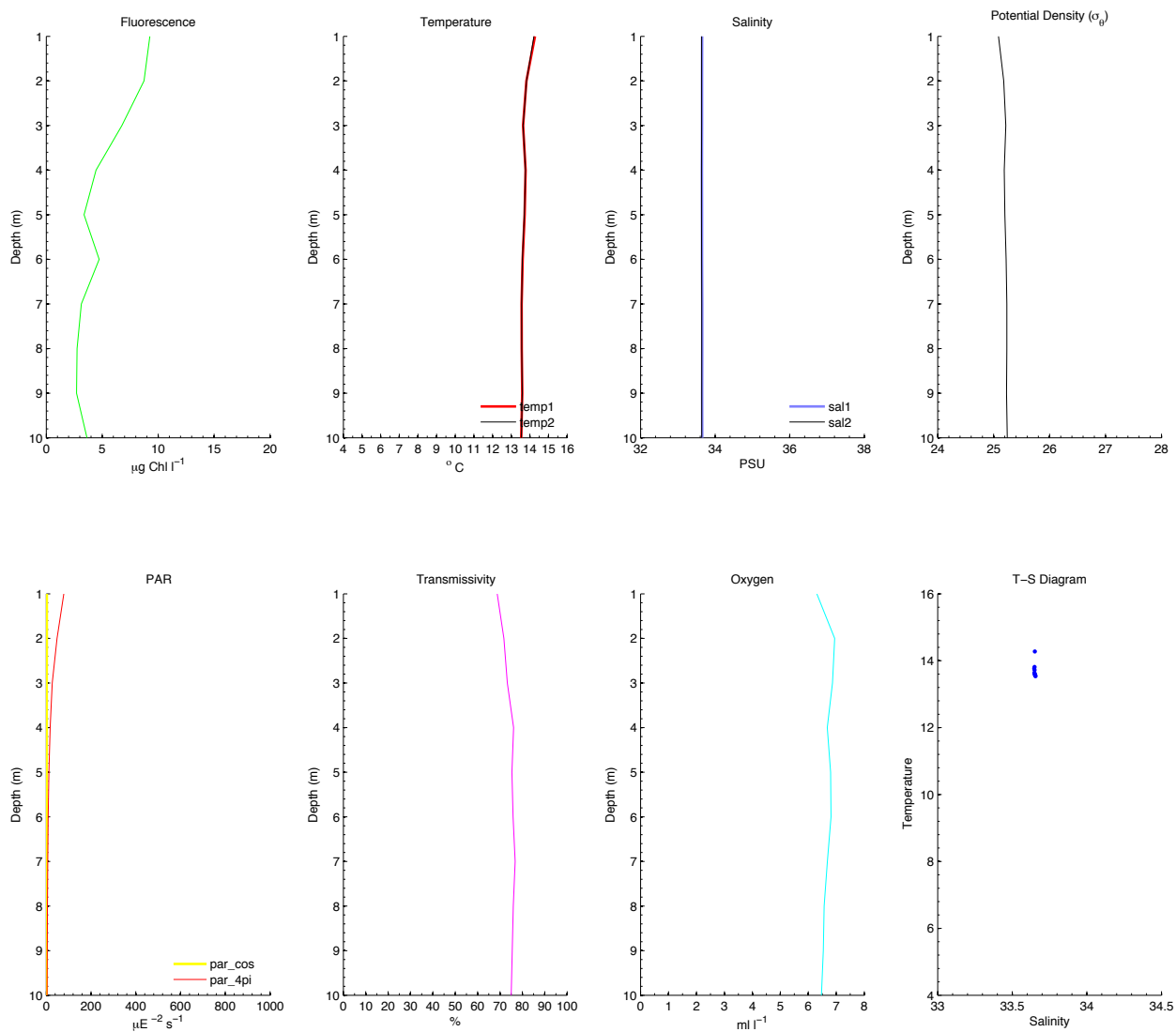
PHILLS Caption: Beautiful day. Clear skies over complete Bay. NRL ship late in getting out because of winch problem. Over NRL ship at end of day. Stage Pitch = +30 degrees. Sweep parameters: 0.8 deg/second, -1.8 to +1.8 degrees roll. Prior to liftoff, could not get cmigits computer started. Cmigits SW mover to navigation computer.

Glider calibration station (Soquel Cove) - (Cast 1, 4): dinos

Cast 1 (0726 PDT [Glider calibration station](#) - Soquel Cove NE MB)

CTD

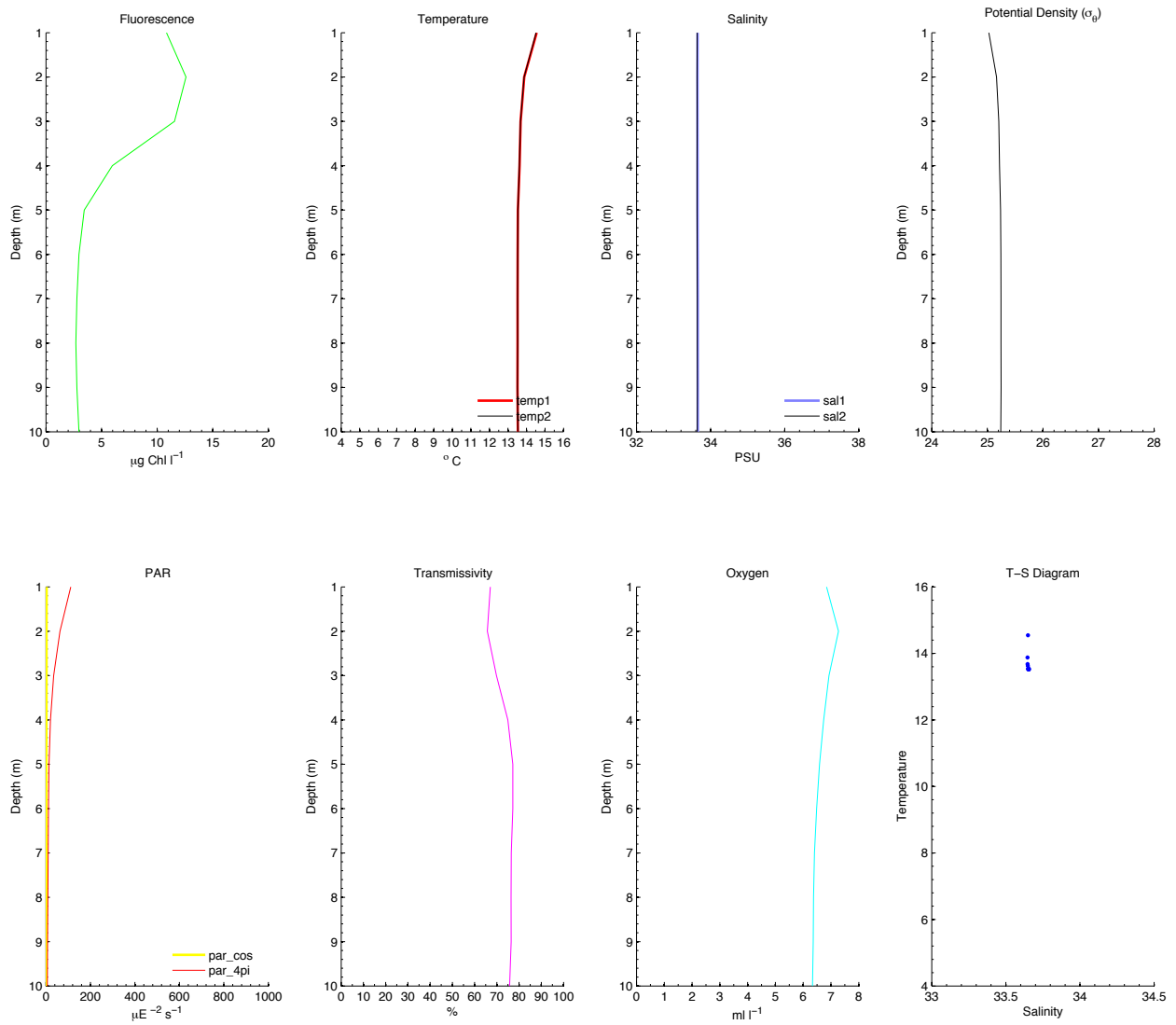
BIOSPACE 2010 Cast 1 (Glider cal; 2010-10-12 15:26:49.000 UTC) CTD Downcast Data (Calibrated)



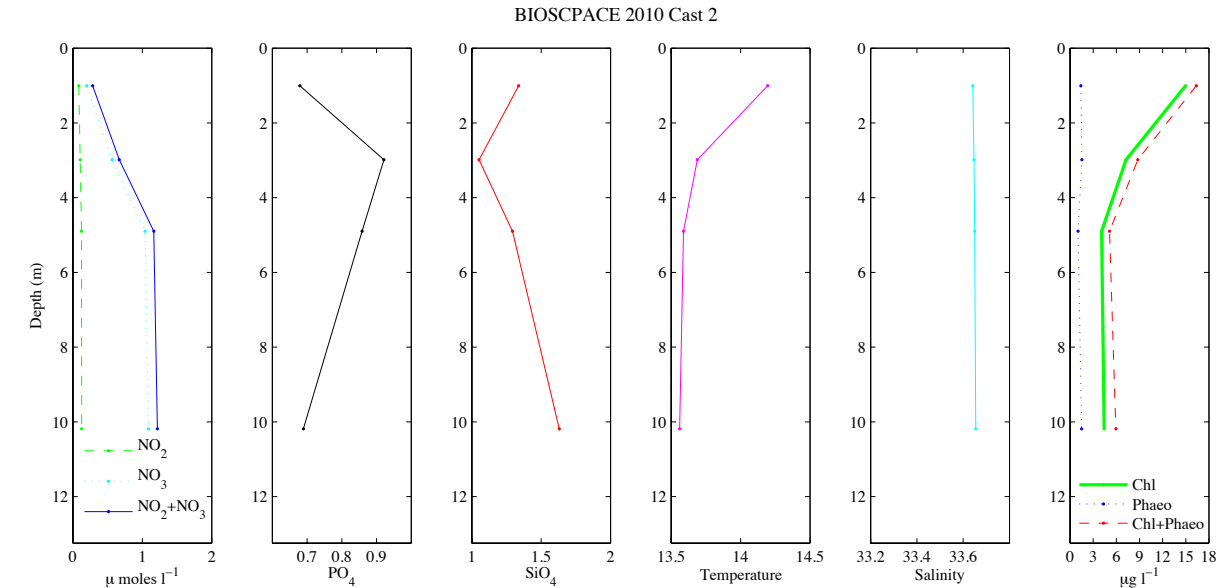
Cast 2 (0808 PDT; [Glider calibration station](#) - Soquel Cove NE MB)

CTD

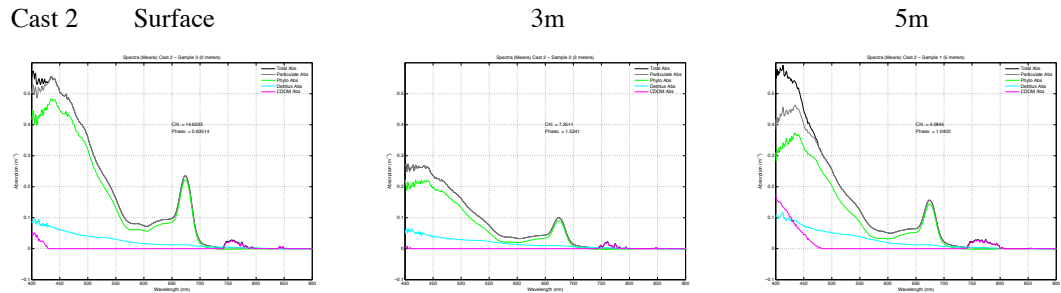
BIOSPACE 2010 Cast 2 (Glider CAL; 2010-10-12 16:08:00.000 UTC) CTD Downcast Data (Calibrated)



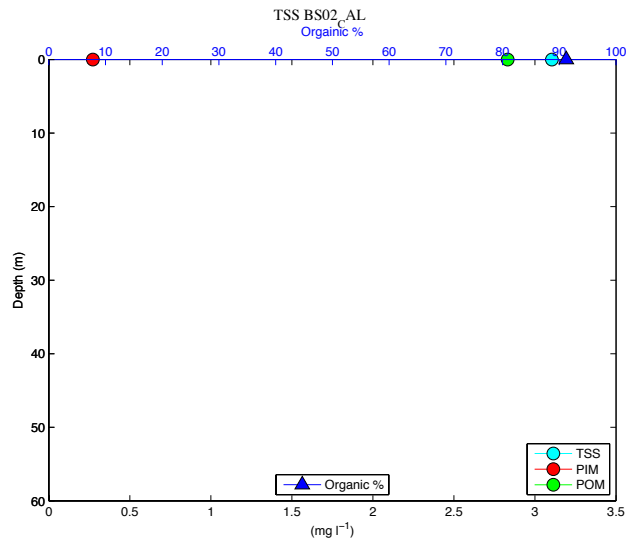
Bottle Nutrients and Chlorophyll



Filter Pad Absorption



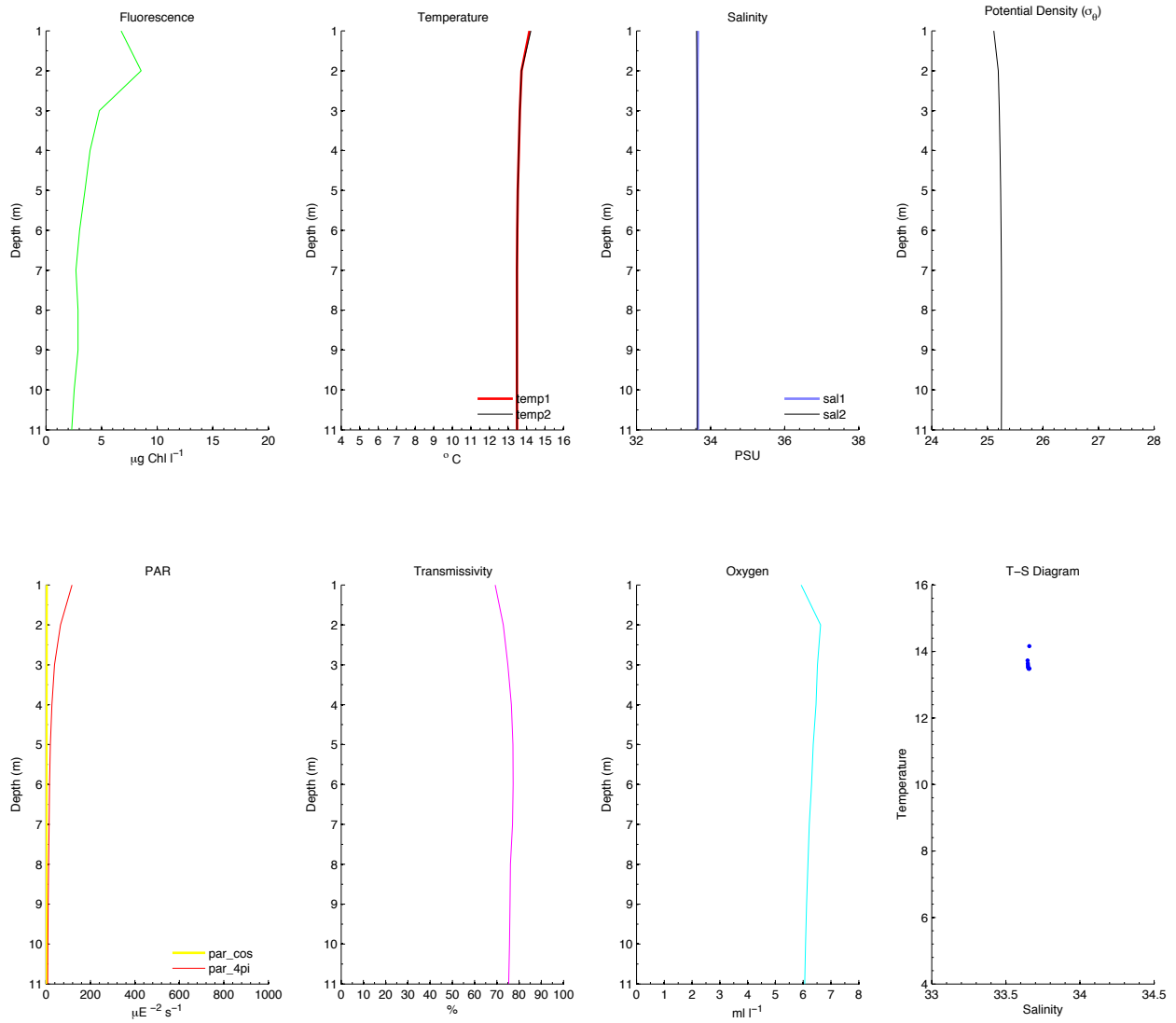
TSS



Cast 3 (0834 PDT [Glider calibration station](#) - Soquel Cove NE MB)

CTD

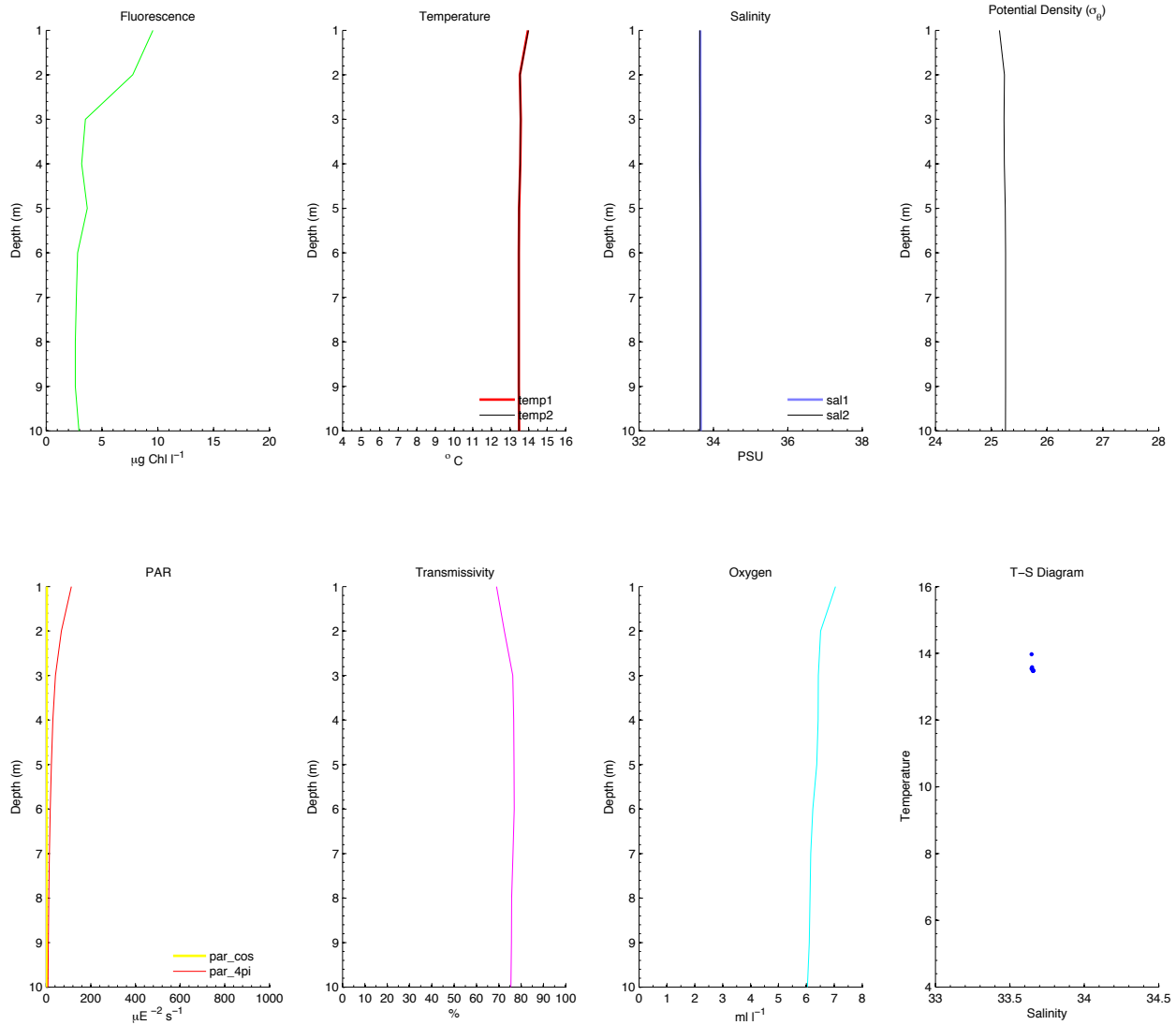
BIOSPACE 2010 Cast 3 (Glider cal; 2010-10-12 16:34:24.000 UTC) CTD Downcast Data (Calibrated)



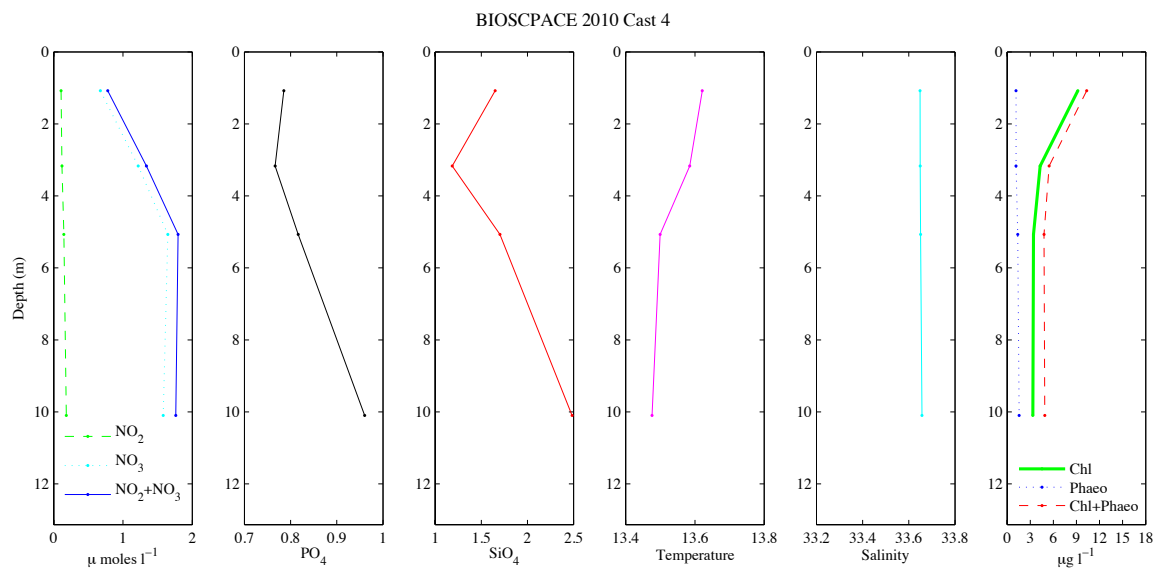
Cast 4 (1000 PDT; [Glider calibration station](#) - Soquel Cove NE MB)
(foggy)

CTD

BIOSPACE 2010 Cast 4 (Glider CAL; 2010-10-12 16:55:00.000 UTC) CTD Downcast Data (Calibrated)

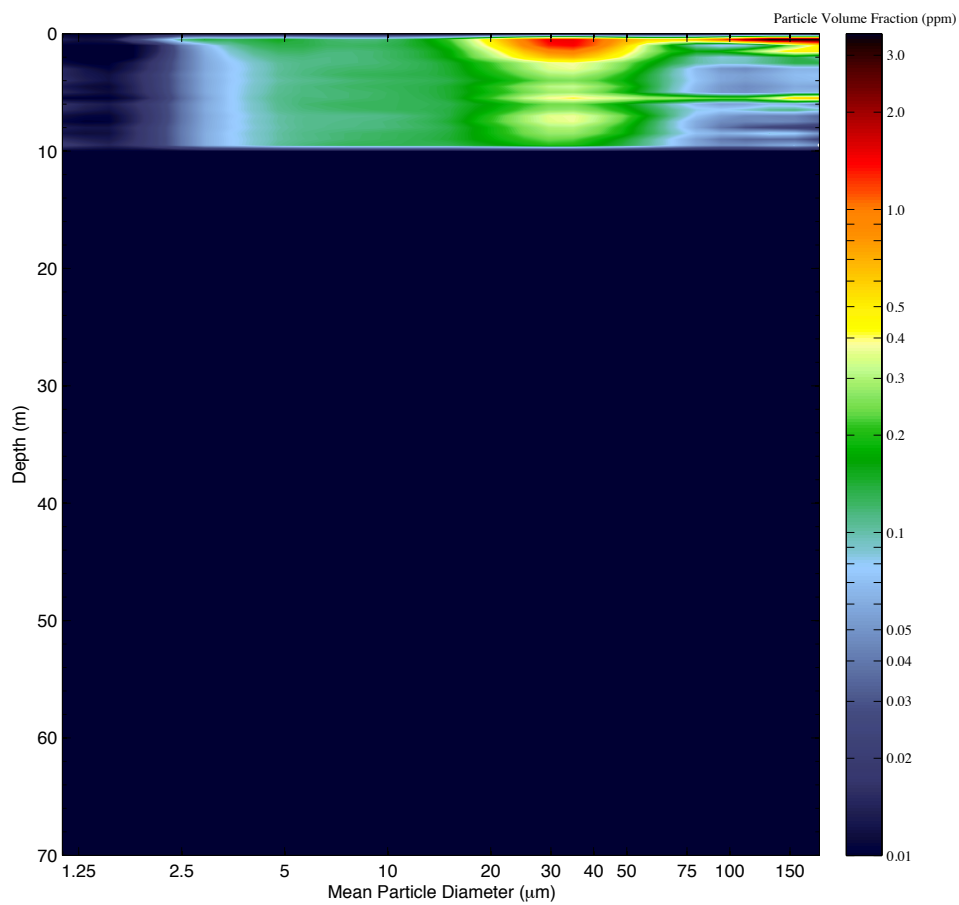


Bottle Nutrients and Chlorophyll

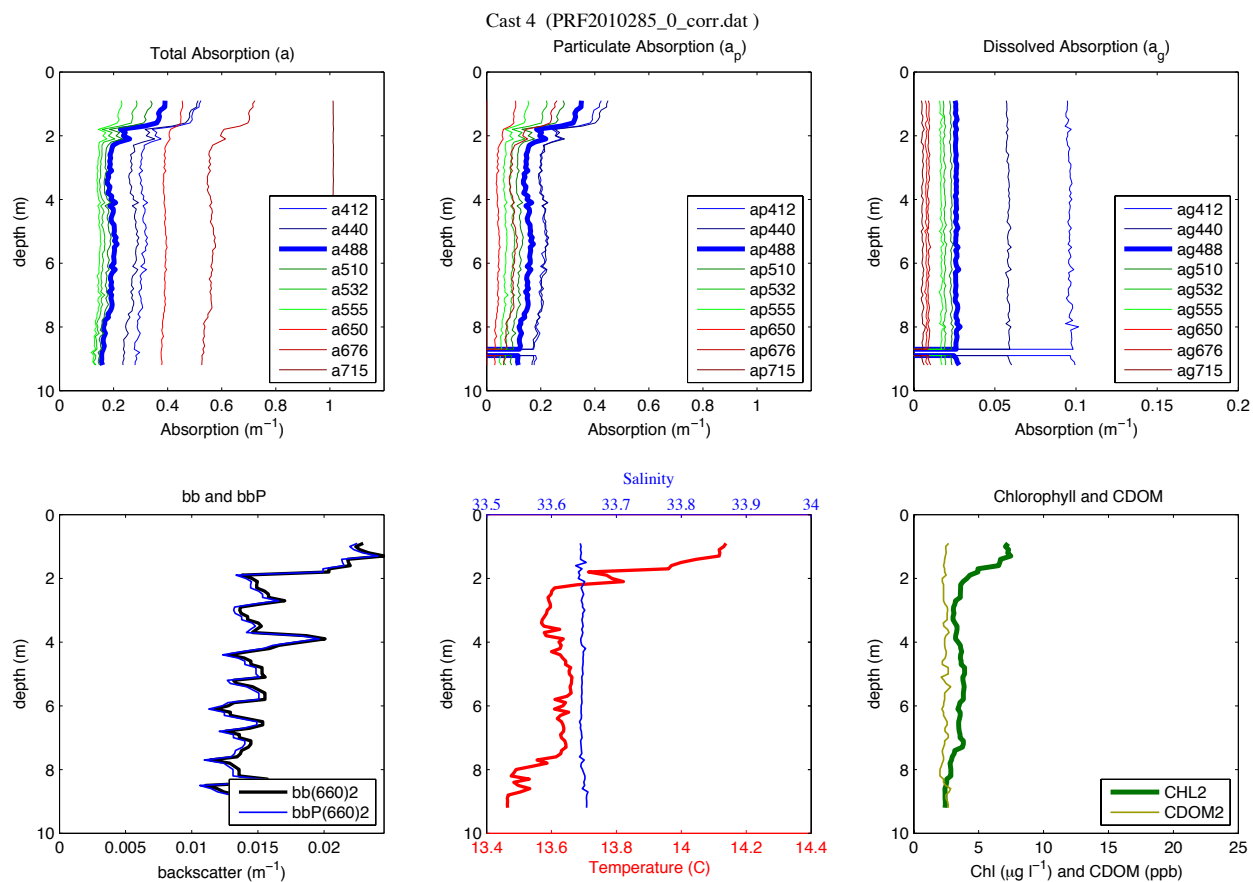


LISST

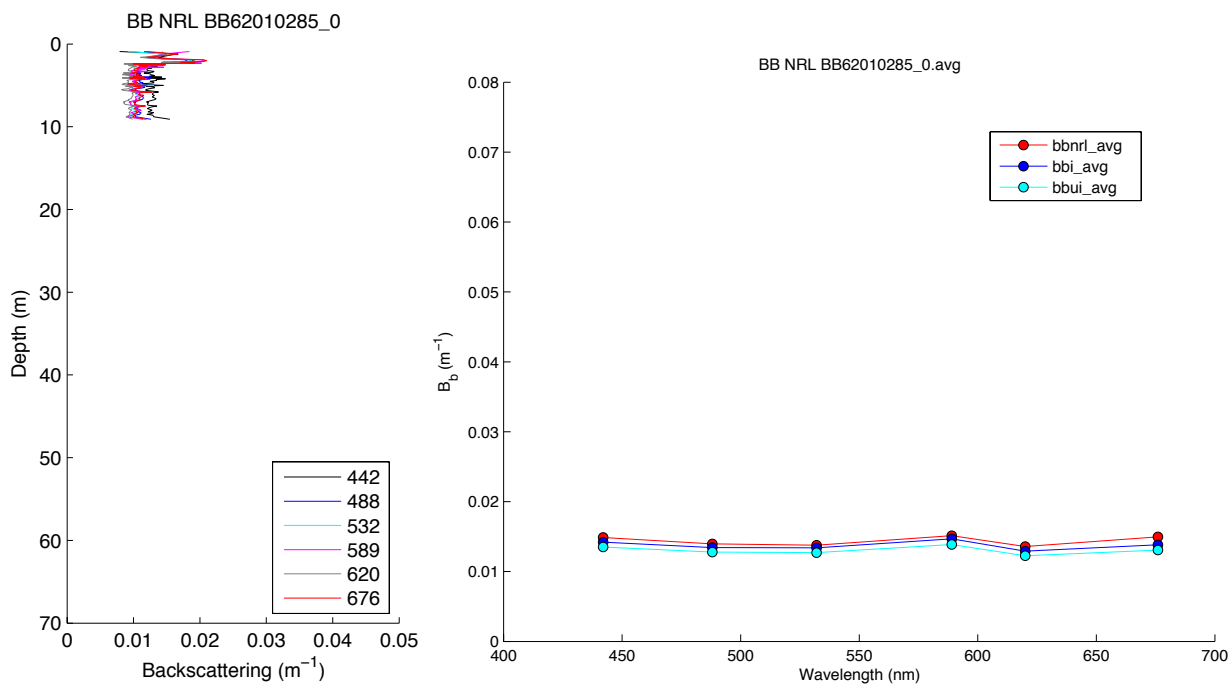
LISST – Cast 04



Optics Profile Package

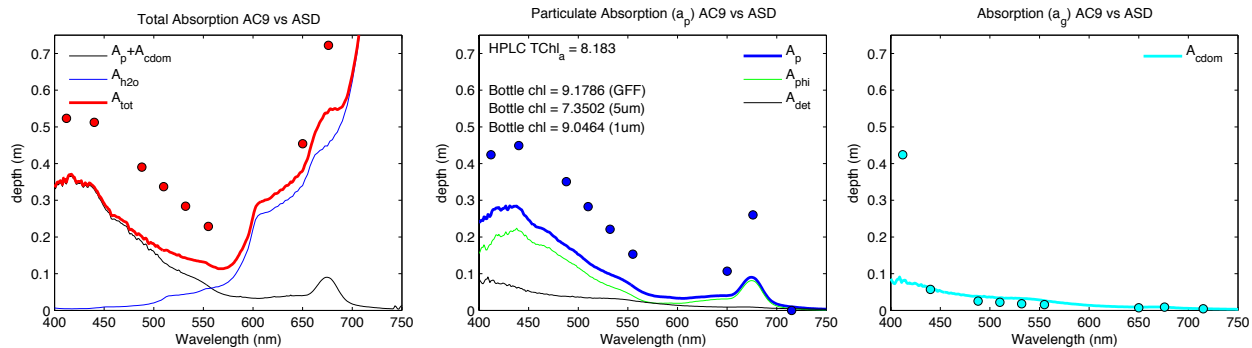


HydroScat

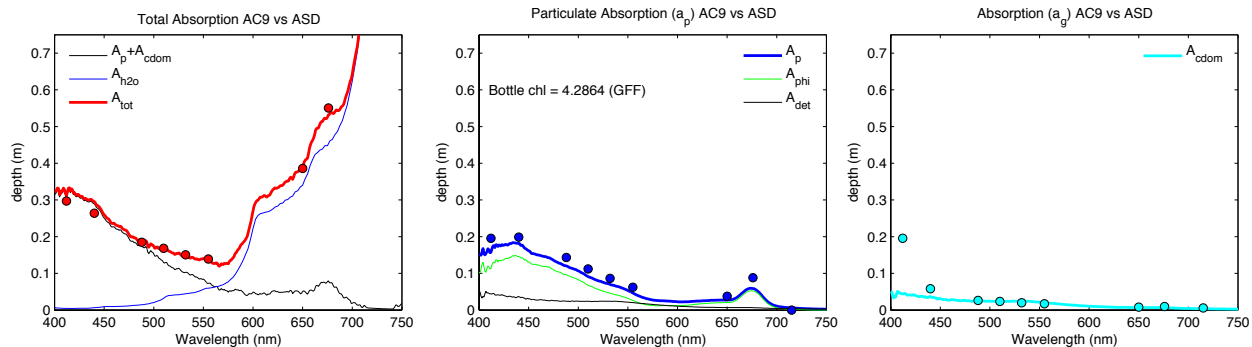


Filter Pad Absorption (w/ AC9)

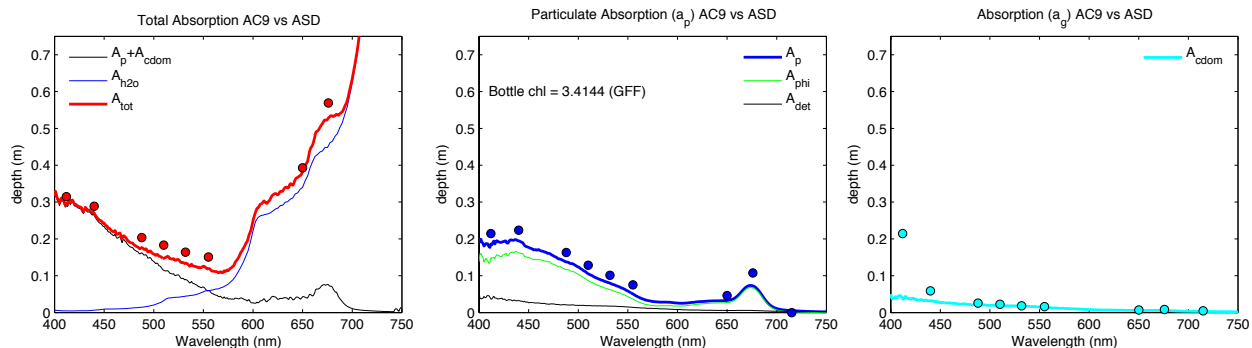
AC9 vs ASD Cast 4 – 0m (PRF2010285_0_corr.dat) glider pre-calibration



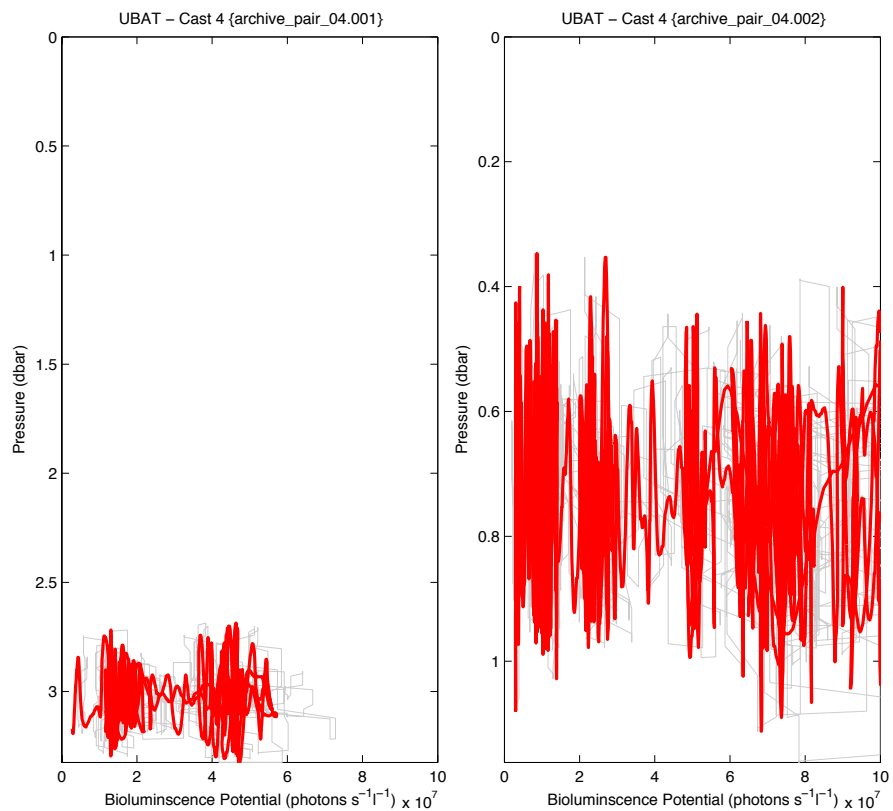
AC9 vs ASD Cast 4 – 3m (PRF2010285_0_corr.dat) glider pre-calibration



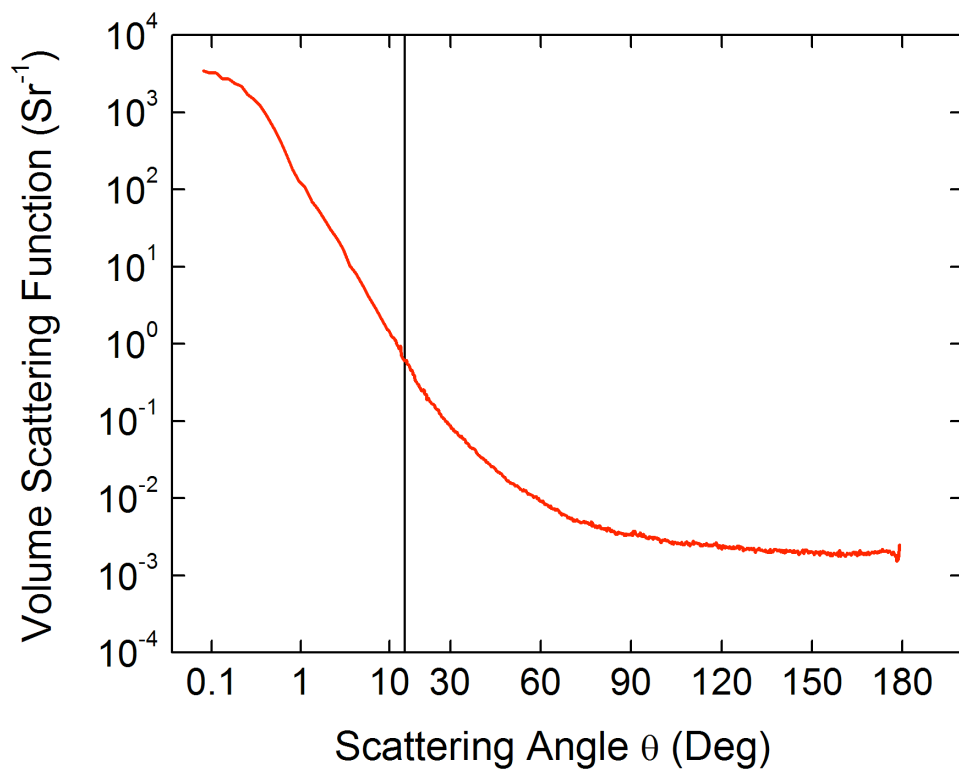
AC9 vs ASD Cast 4 – 5m (PRF2010285_0_corr.dat) glider pre-calibration



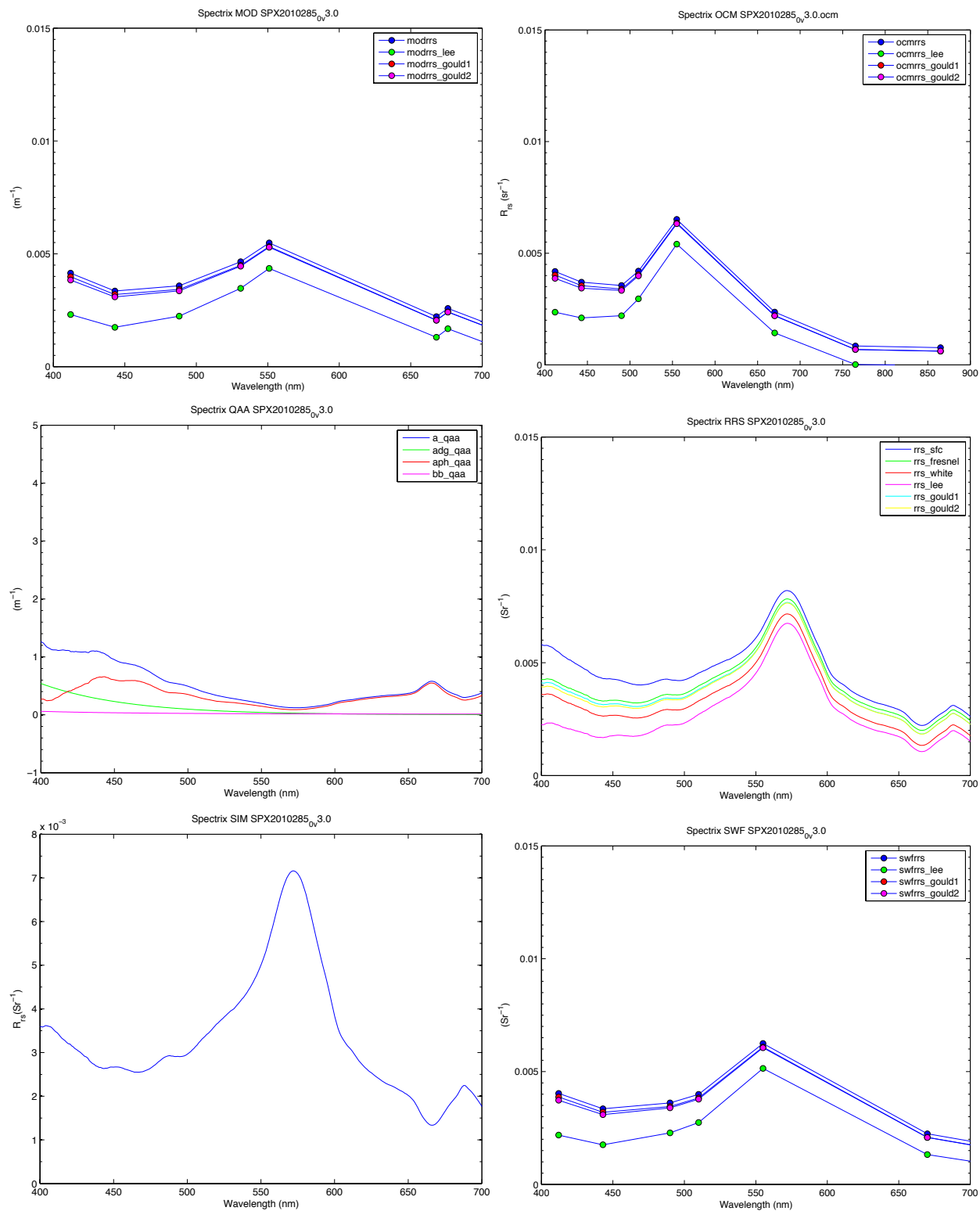
UBAT



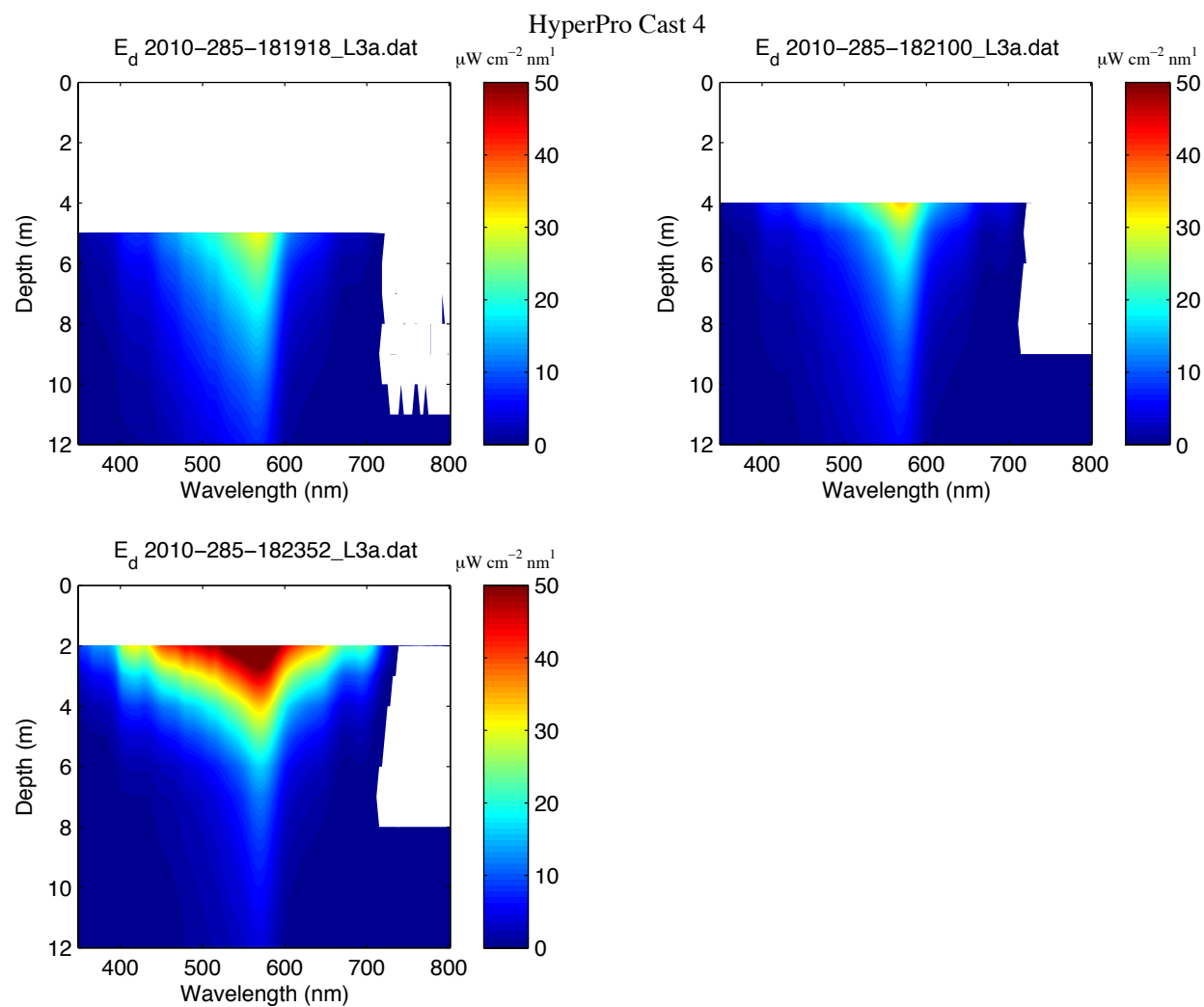
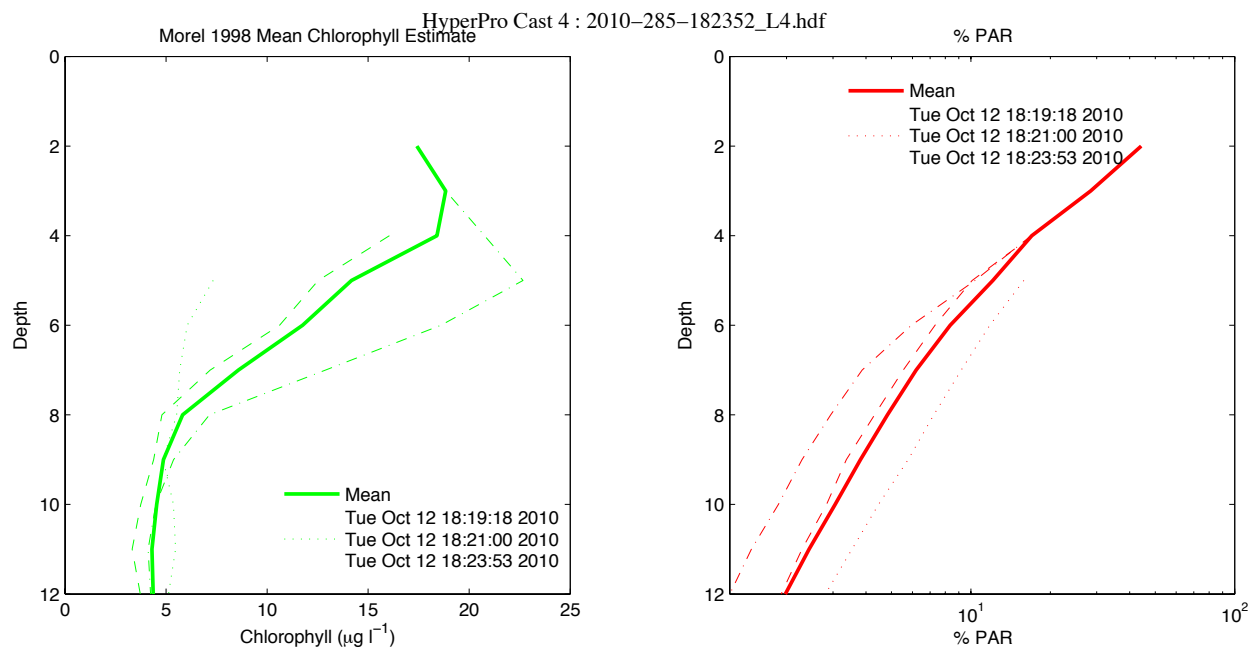
MVSC (532 nm)



SPECTRIX



HyperPro



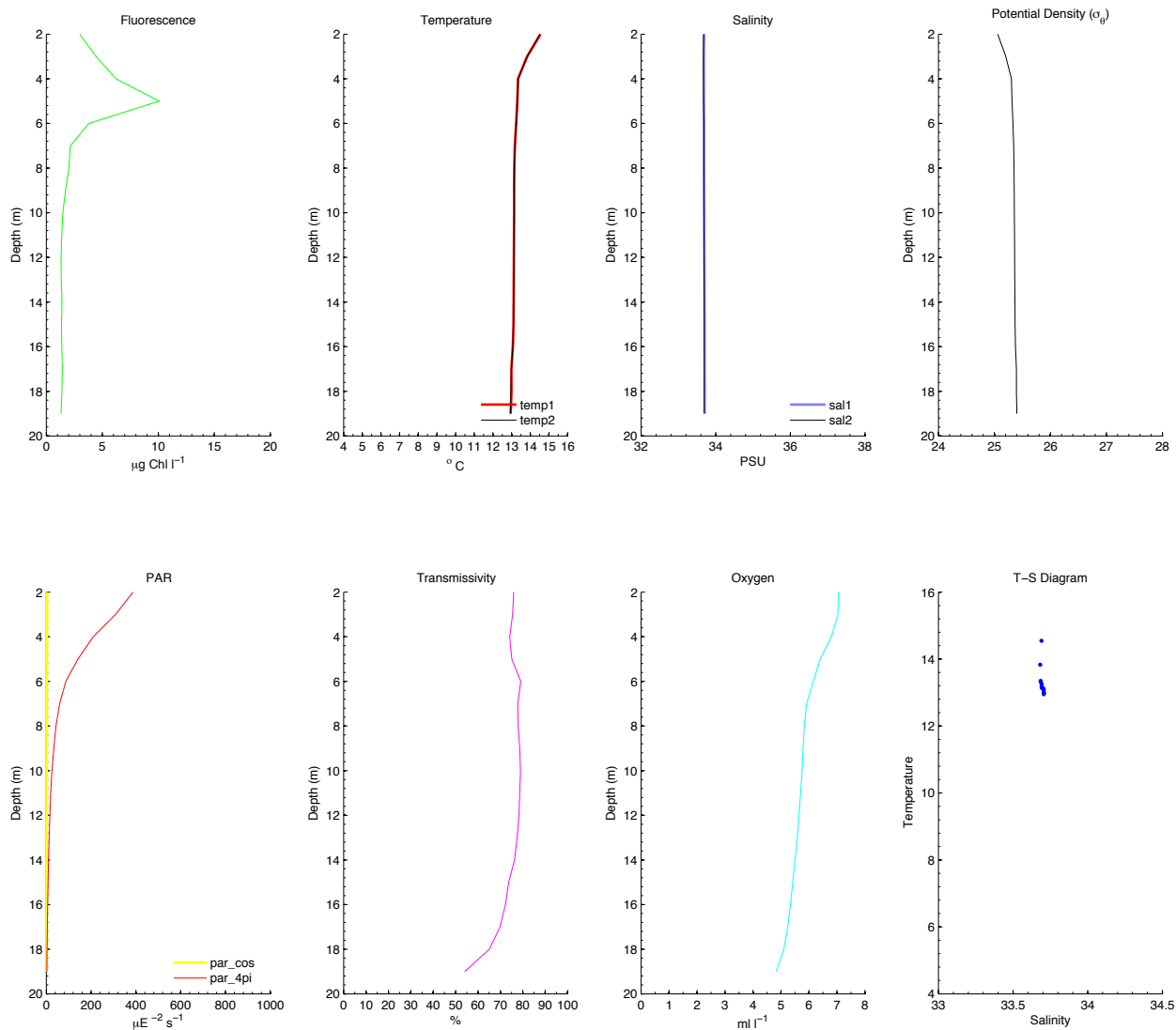
NRL mooring S1-4 (Casts 5-8)

S1&2: d'inos

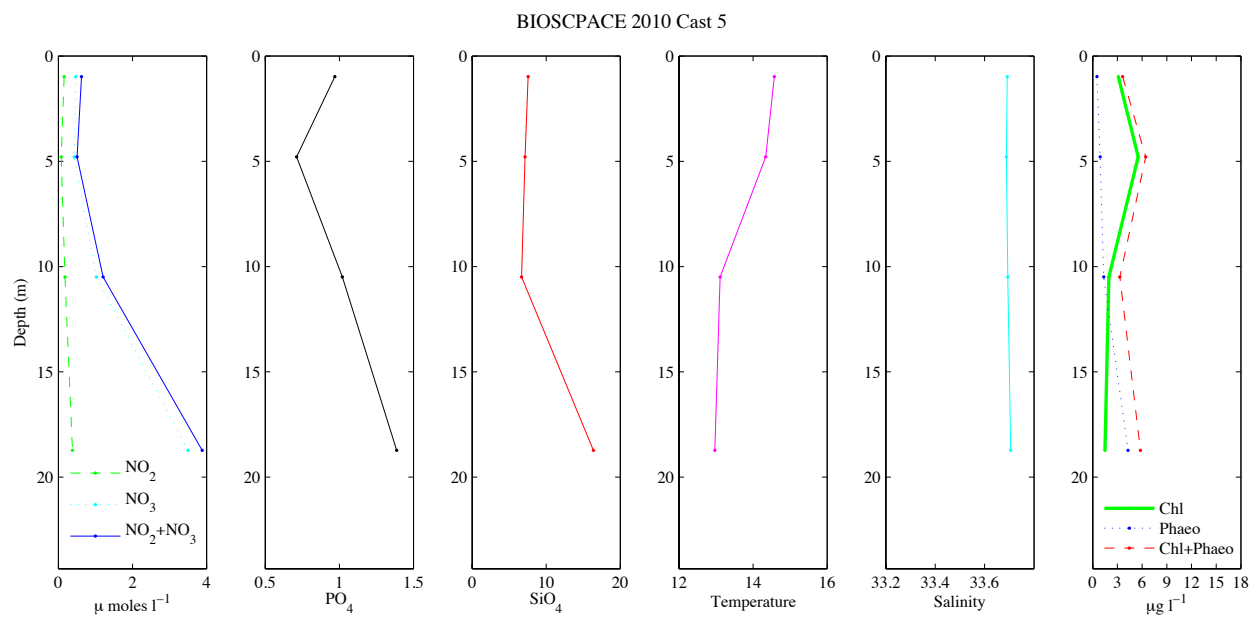
Cast 5 (1600 PDT; [NRL Mooring S1](#)) (foggy)

CTD

BIOSPACE 2010 Cast 5 (S1; 2010-10-12 23:01:00.000 UTC) CTD Downcast Data (Calibrated)

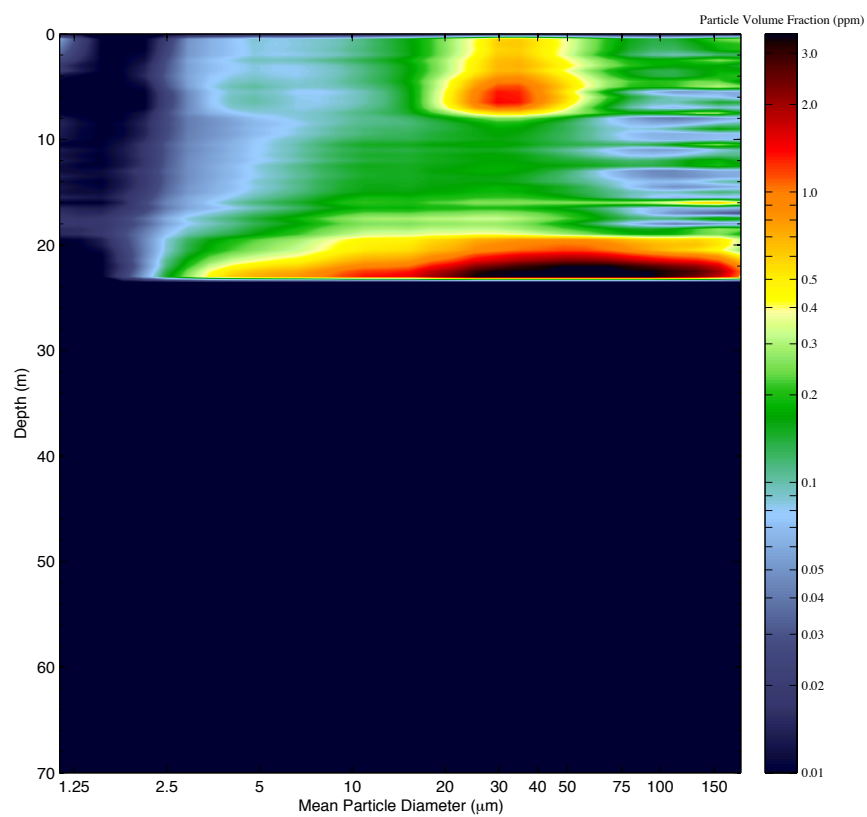


Bottle Nutrients and Chlorophyll

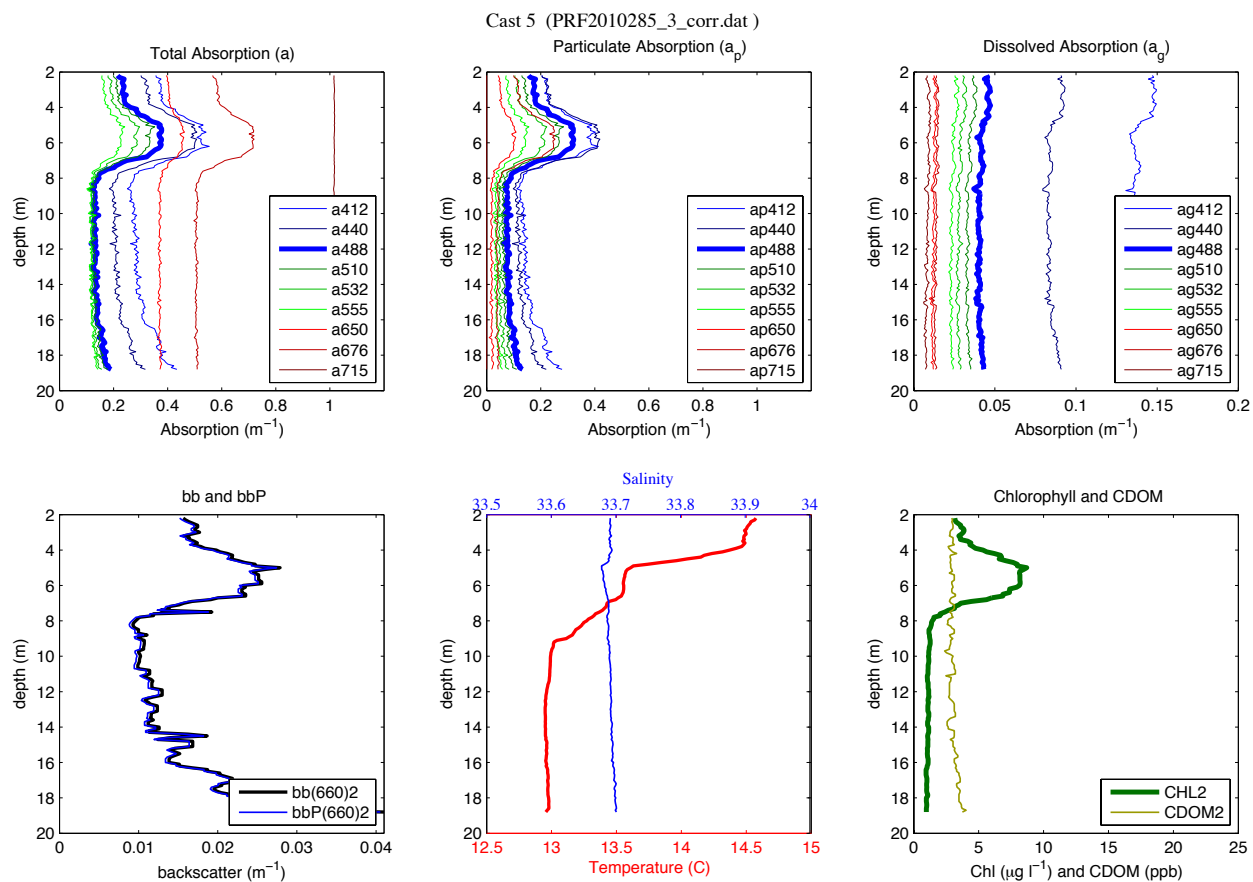


LISST

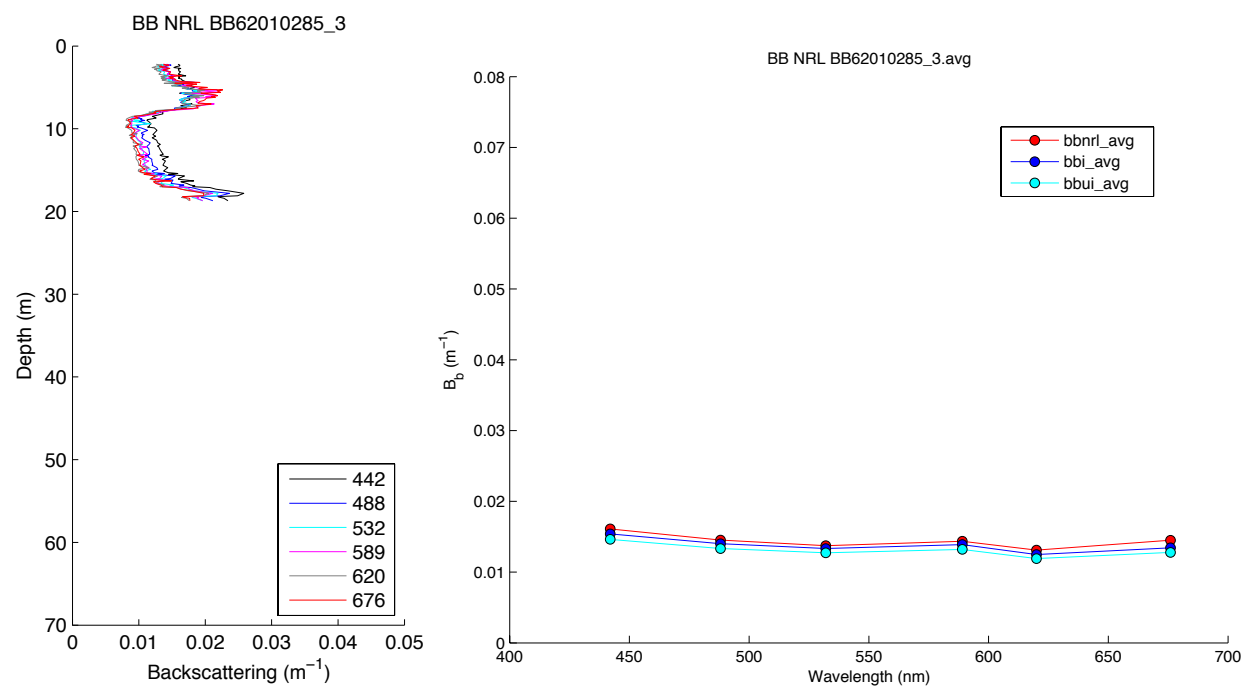
LISST – Cast 05



Optics Profile Package

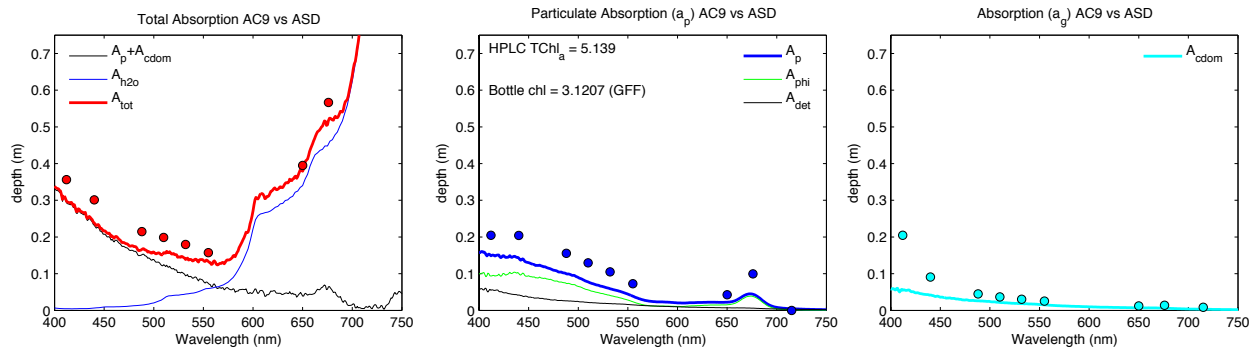


HydroScat

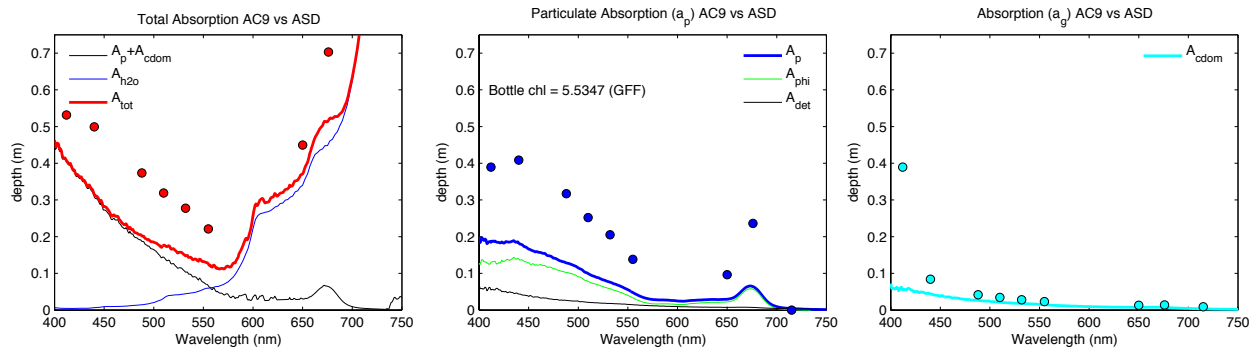


Filter Pad Absorption (w/ AC9)

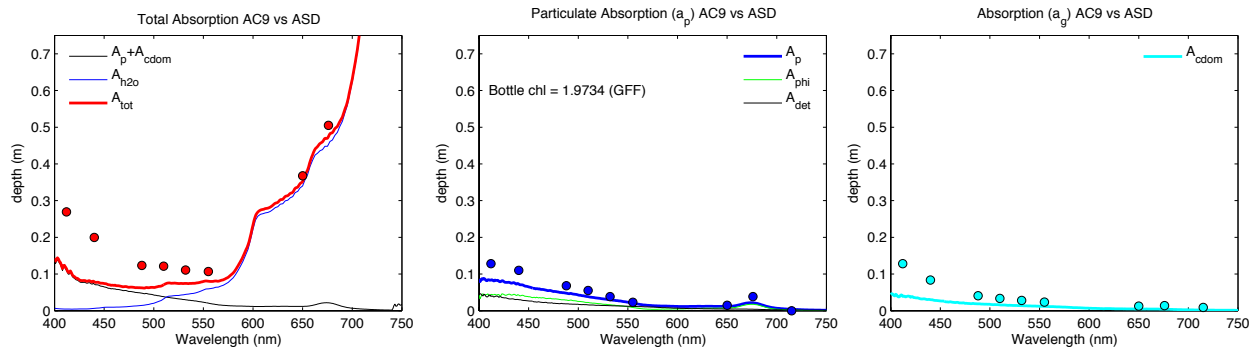
AC9 vs ASD Cast 5 – 0m (PRF2010285_3_corr.dat) glider pre-calibration



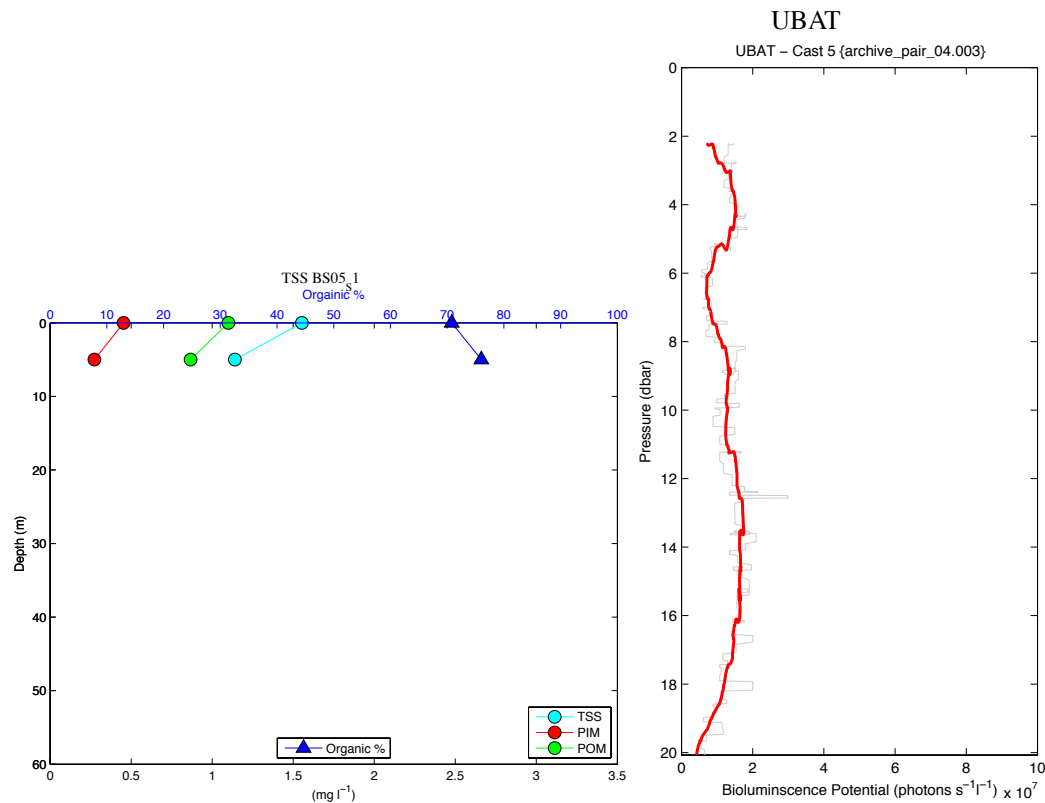
AC9 vs ASD Cast 5 – 5m (PRF2010285_3_corr.dat) glider pre-calibration



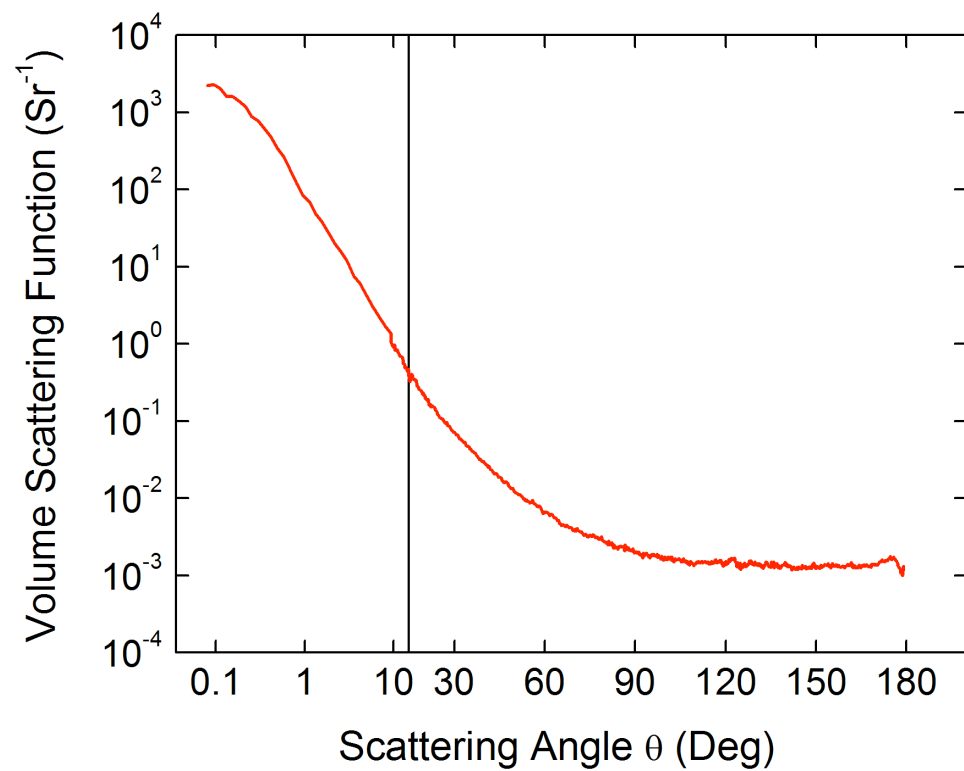
AC9 vs ASD Cast 5 – 10m (PRF2010285_3_corr.dat) glider pre-calibration



TSS



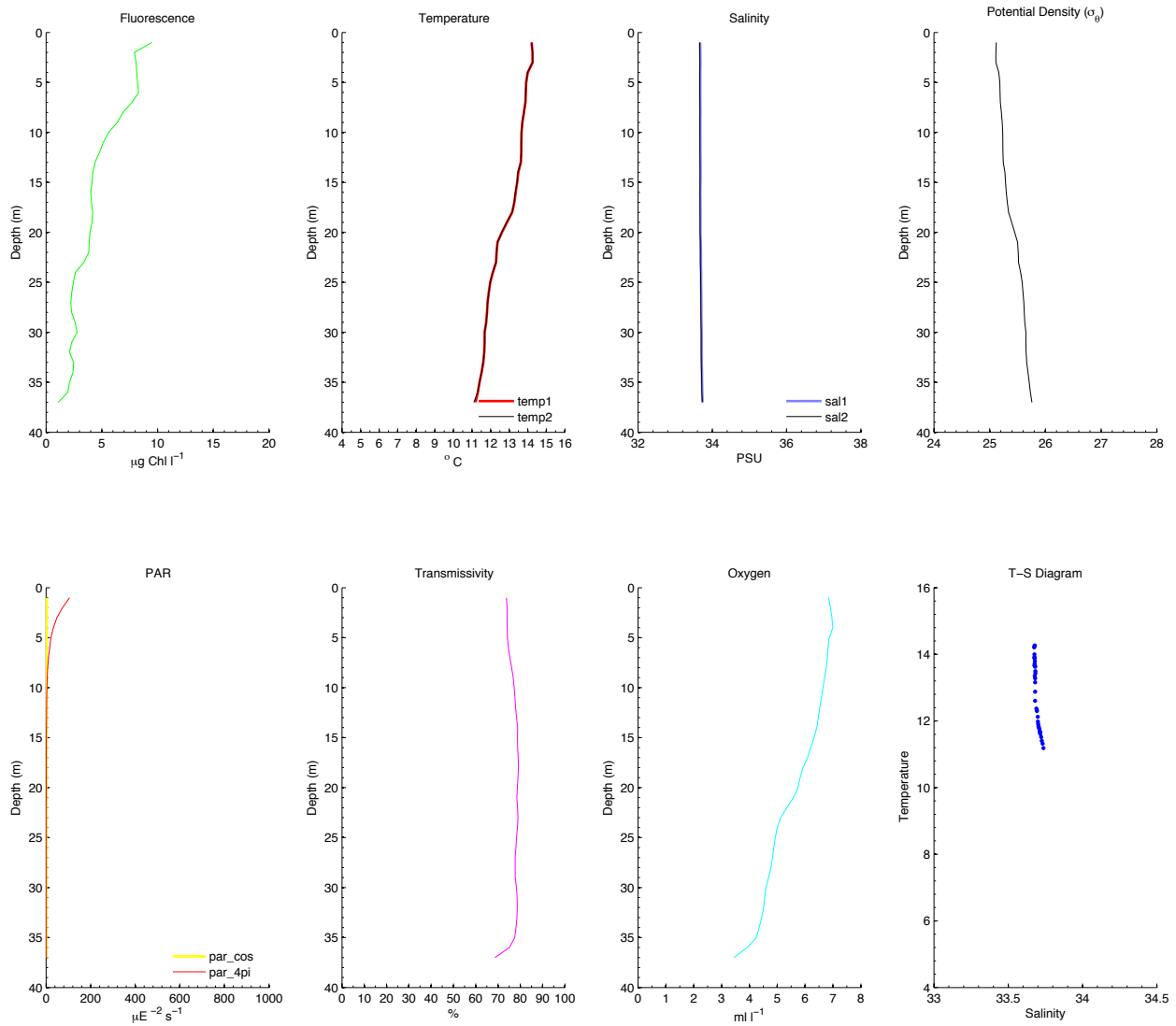
MVSC (532 nm)



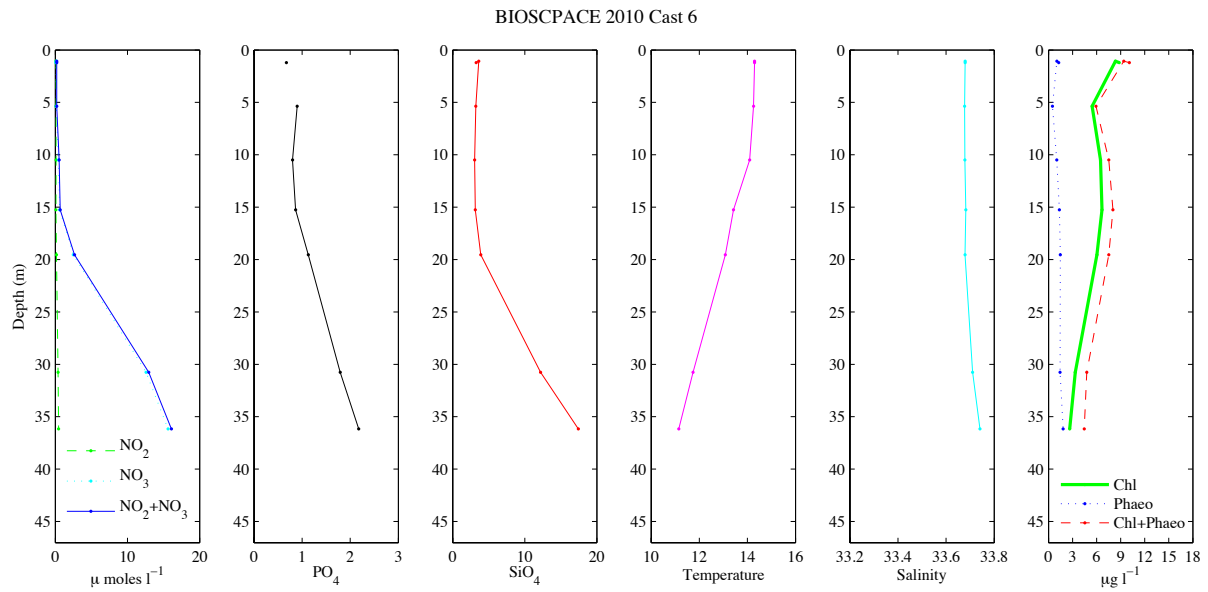
Cast 6 (1743 PDT; [NRL Mooring S2](#))
(foggy)

CTD

BIOSPACE 2010 Cast 6 (S2; 2010-10-13 00:44:00.000 UTC) CTD Downcast Data (Calibrated)

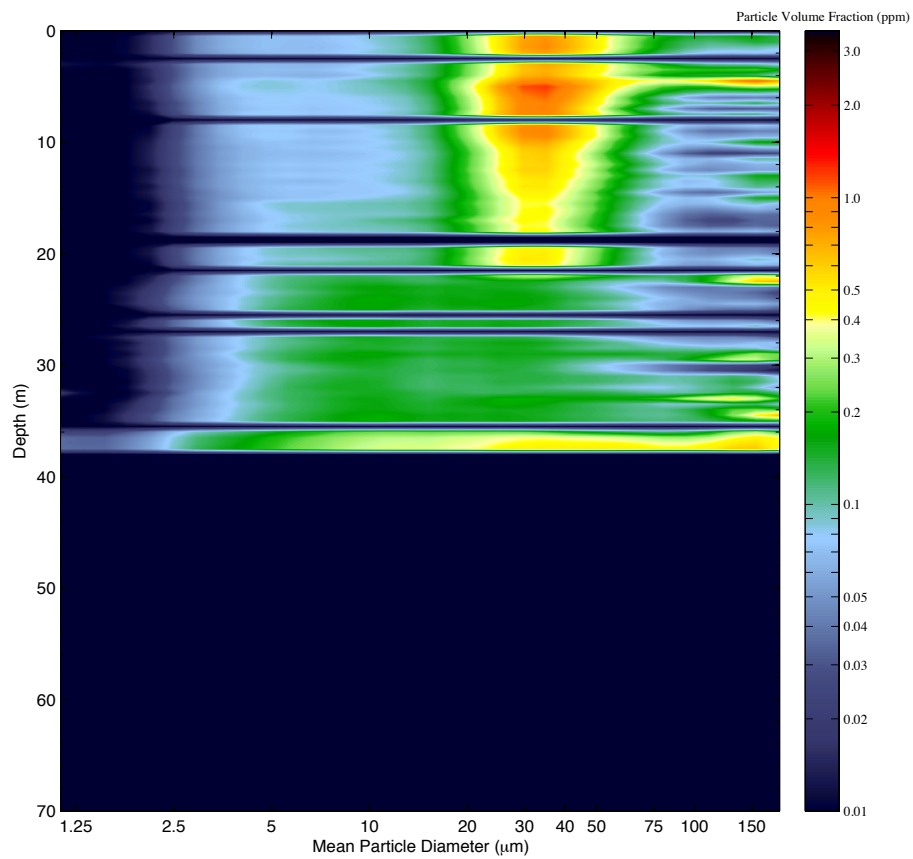


Bottle Nutrients and Chlorophyll

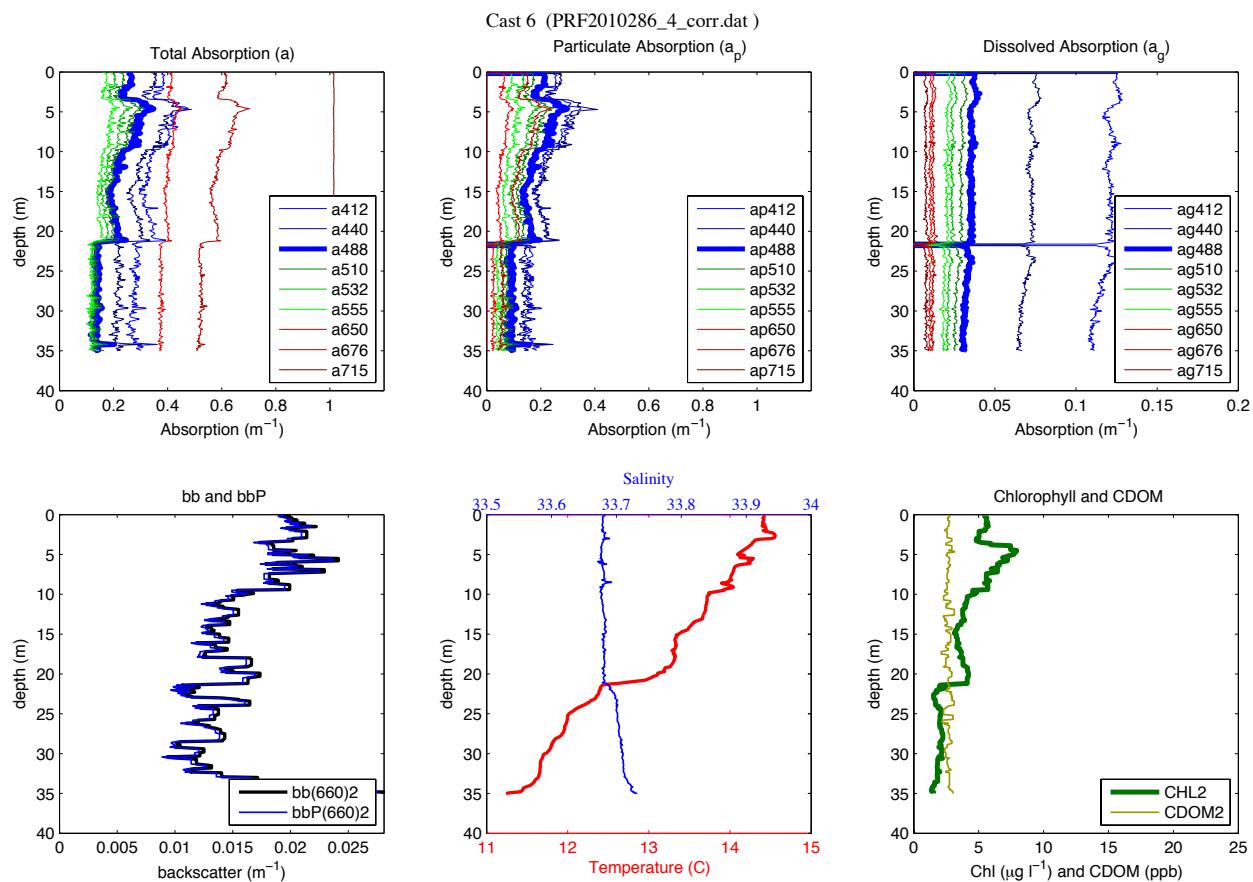


LISST

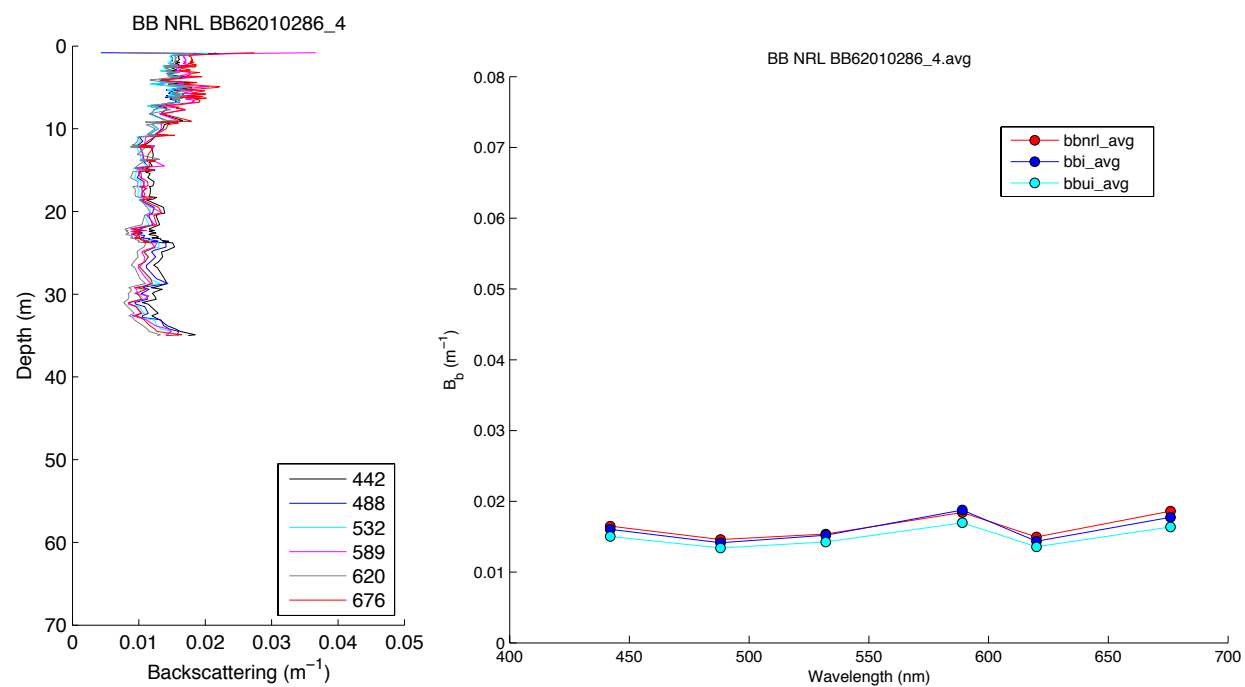
LISST – Cast 06



Optics Profile Package

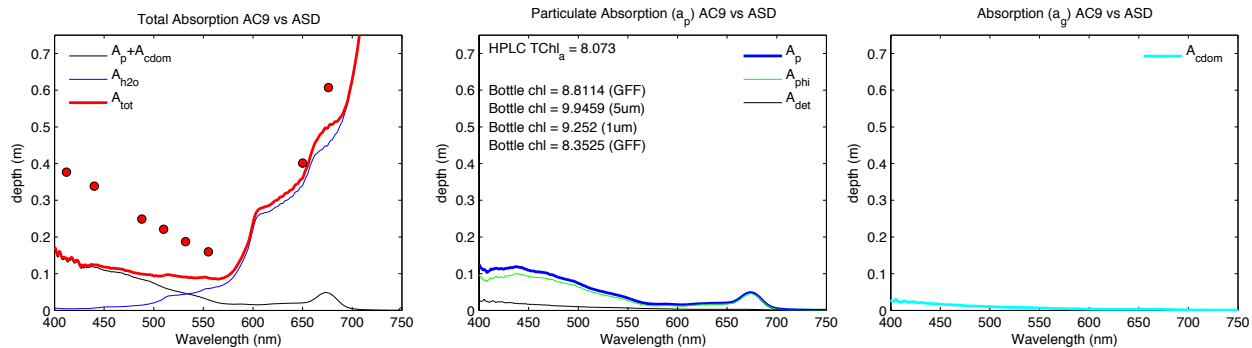


HydroScat

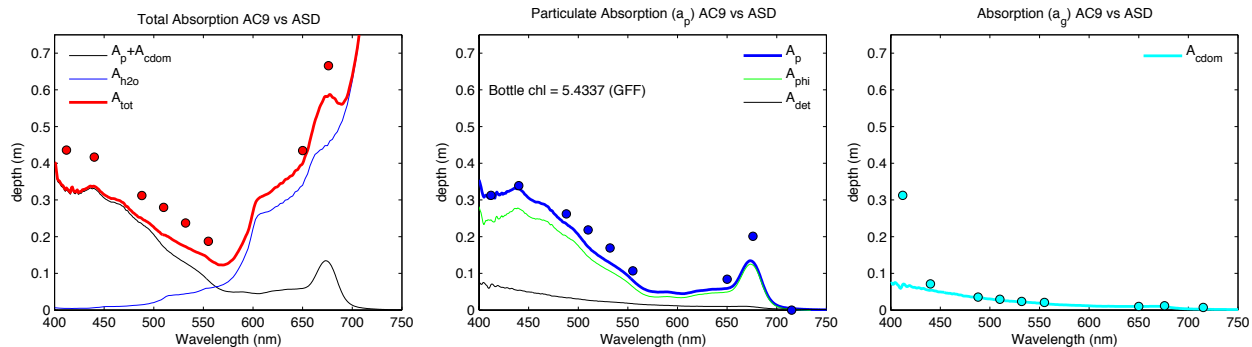


Filter Pad Absorption (w/ AC9)

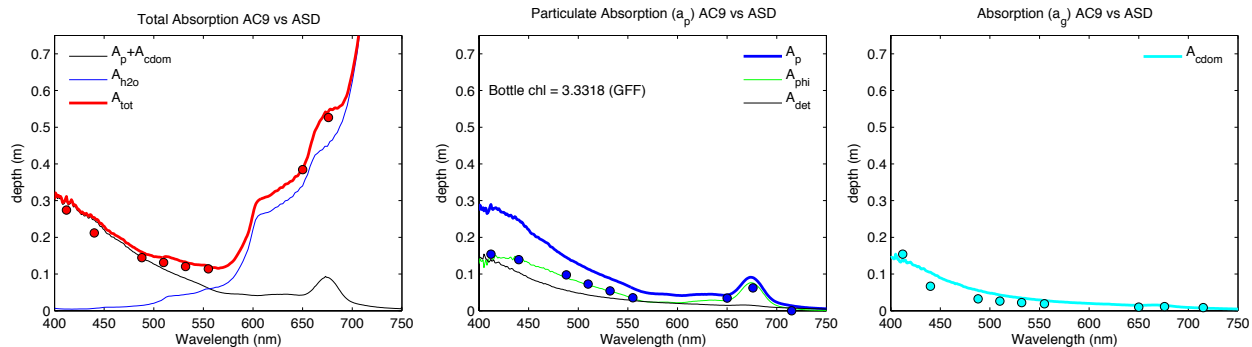
AC9 vs ASD Cast 6 - 0m (PRF2010286_4_corr.dat) NRL.s1



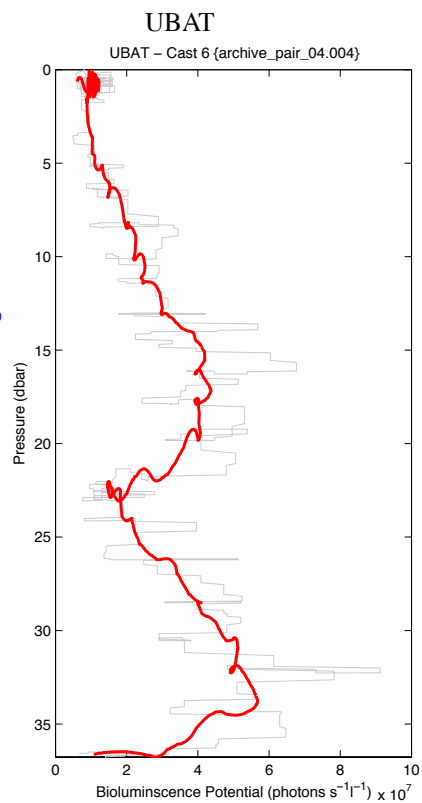
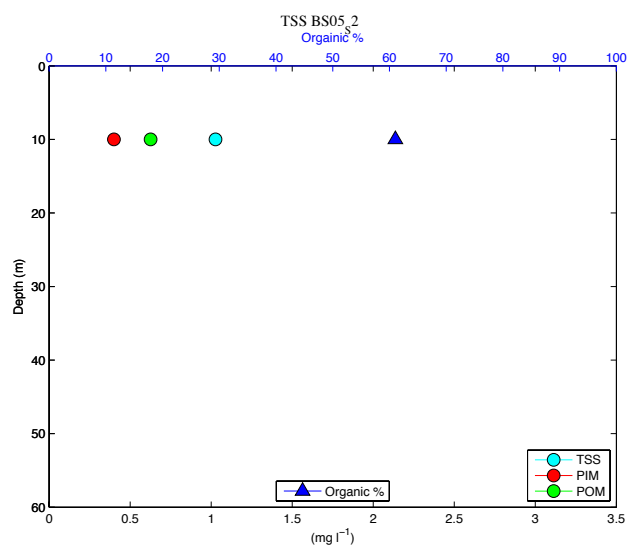
AC9 vs ASD Cast 6 - 5m (PRF2010286_4_corr.dat) NRL.s1



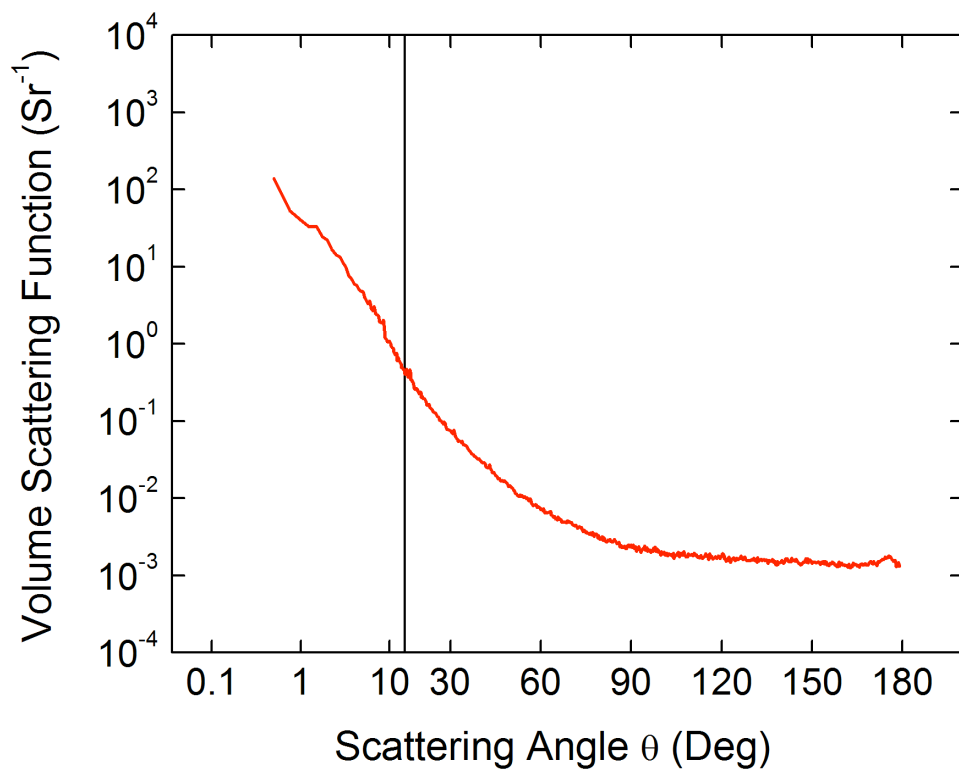
AC9 vs ASD Cast 6 - 30m (PRF2010286_4_corr.dat) NRL.s1



TSS



MVSM (555 nm)



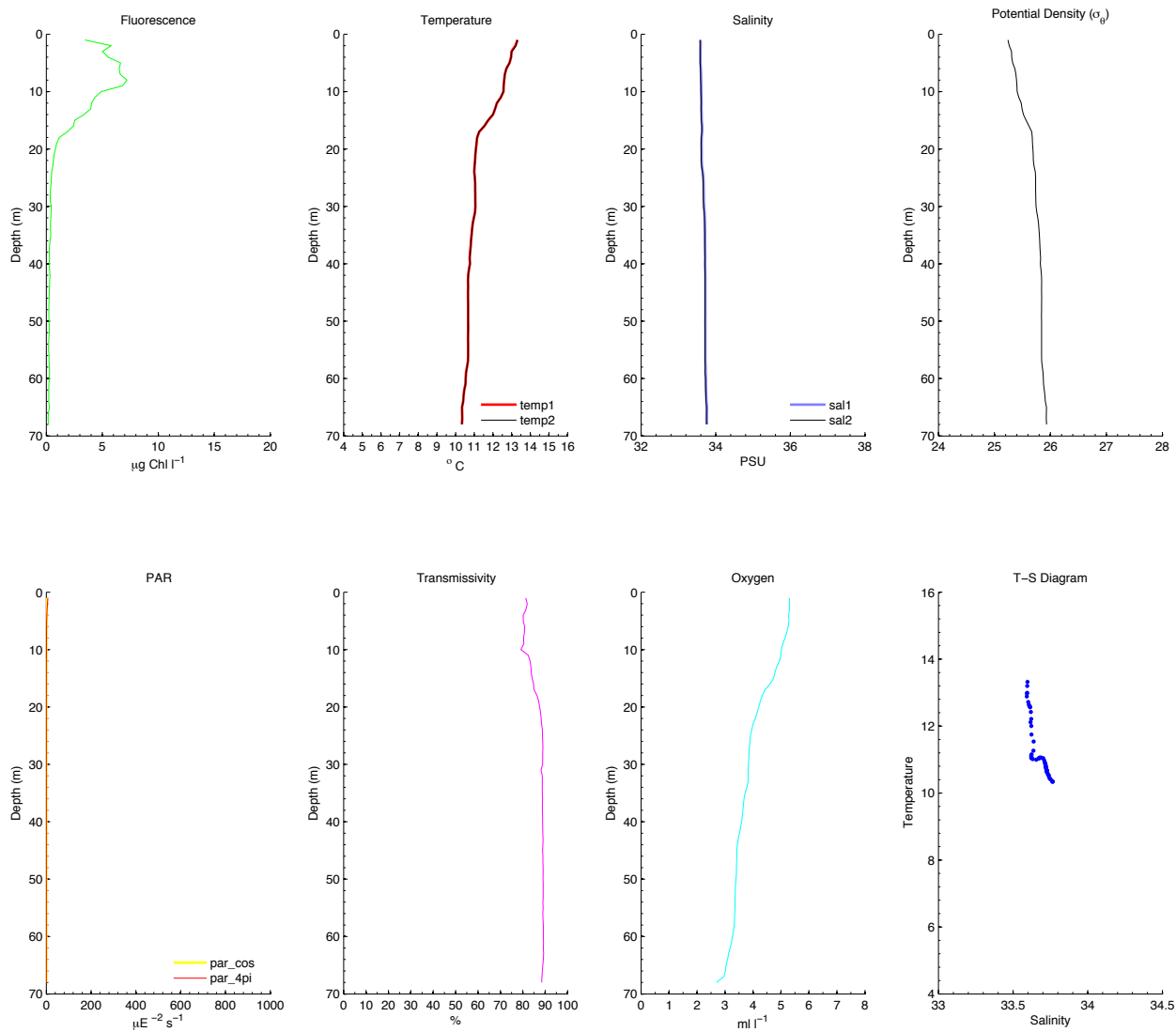
S3&S4 (Casts 7&8): diatoms

Cast 7 (1830 PDT; [NRL Mooring S3](#))

(foggy)

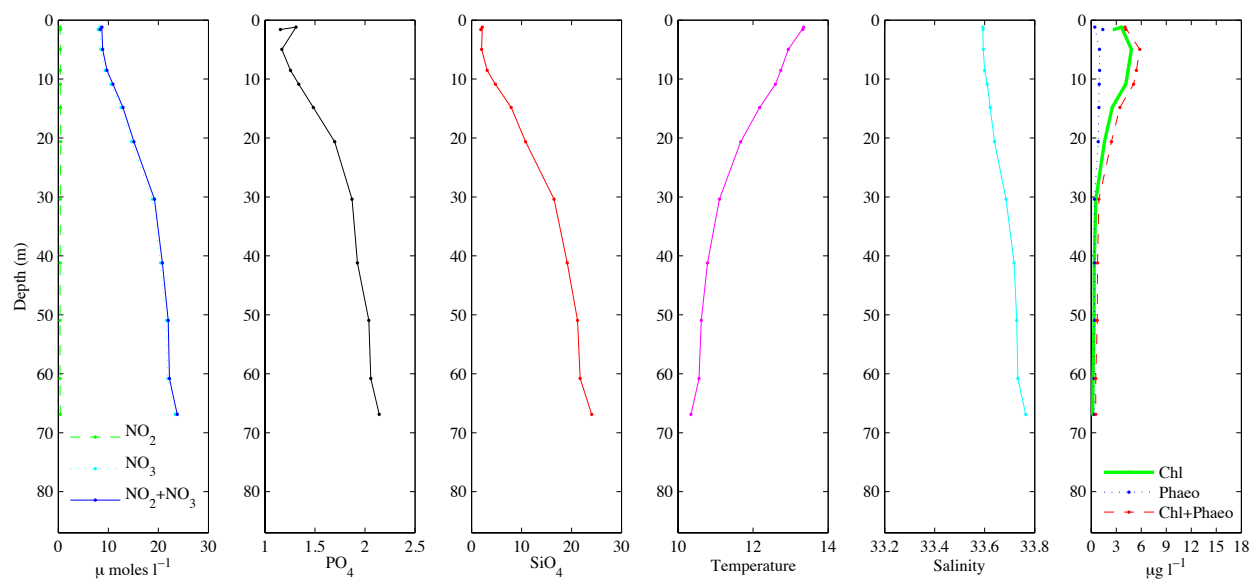
CTD

BIOSPACE 2010 Cast 7 (S3; 2010-10-13 01:43:00.000 UTC) CTD Downcast Data (Calibrated)



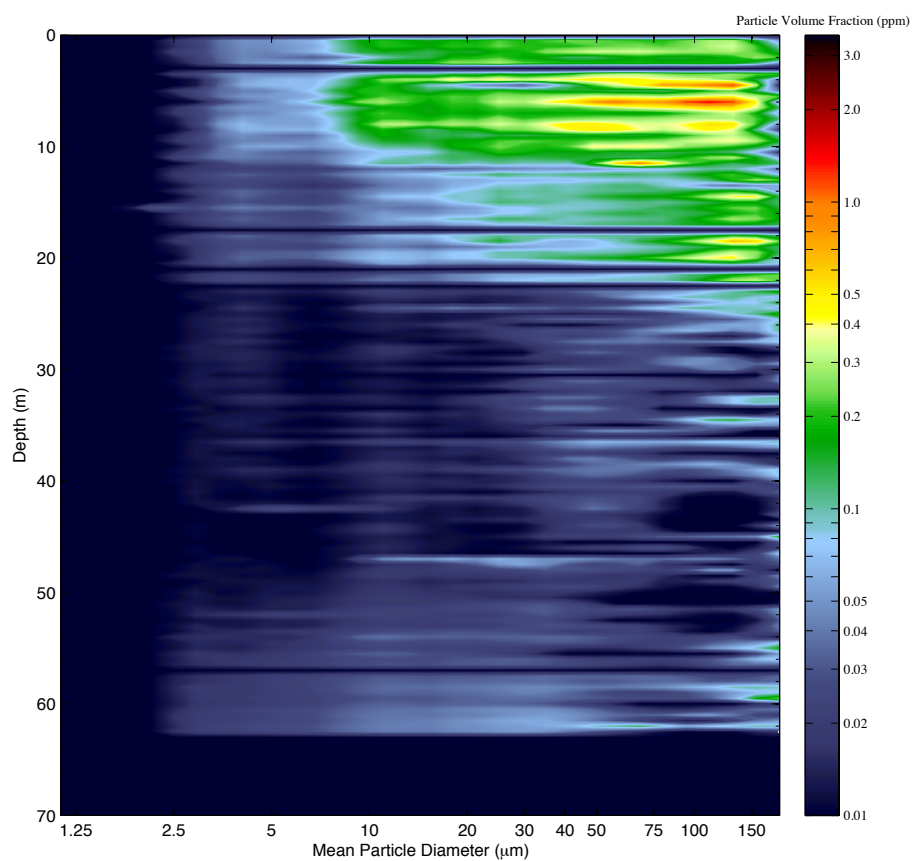
Bottle Nutrients and Chlorophyll

BIOSPACE 2010 Cast 7

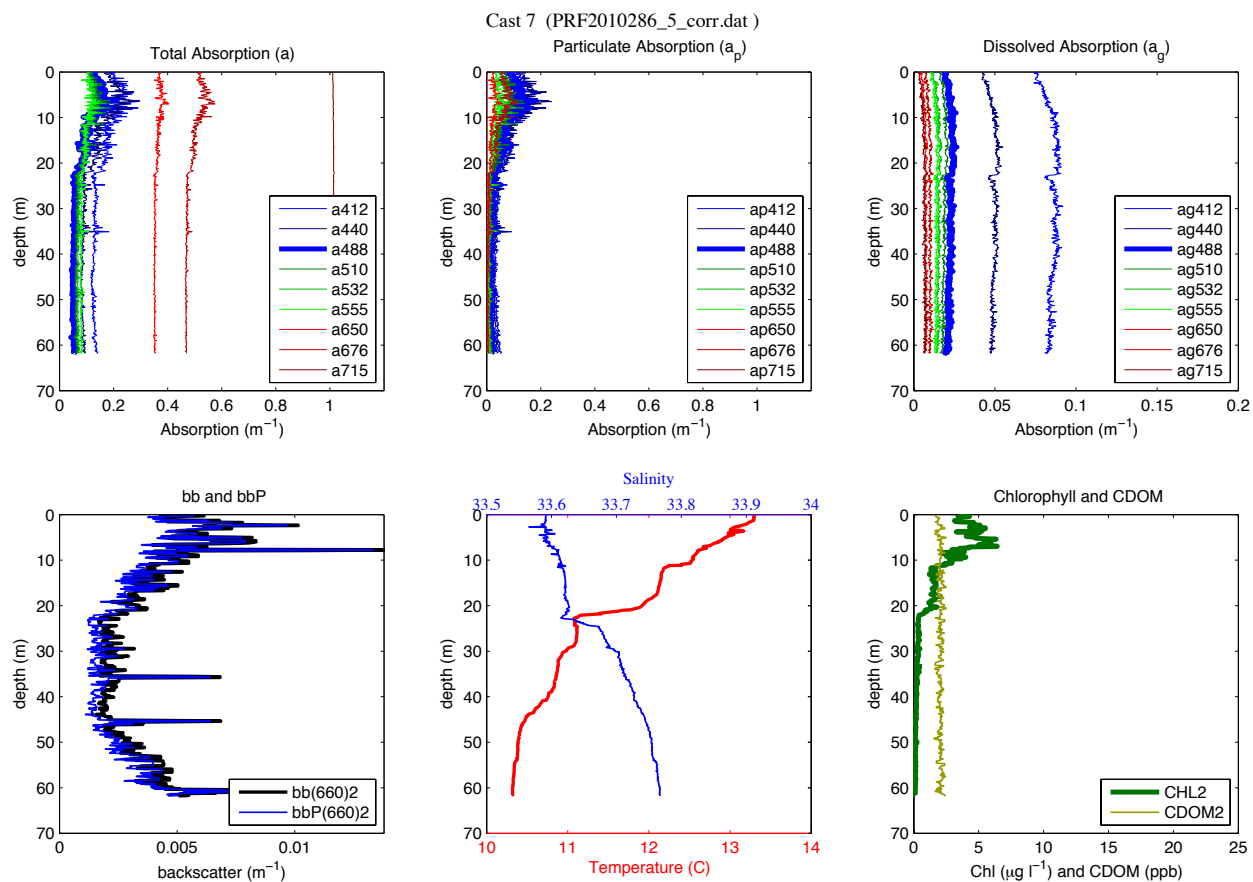


LISST

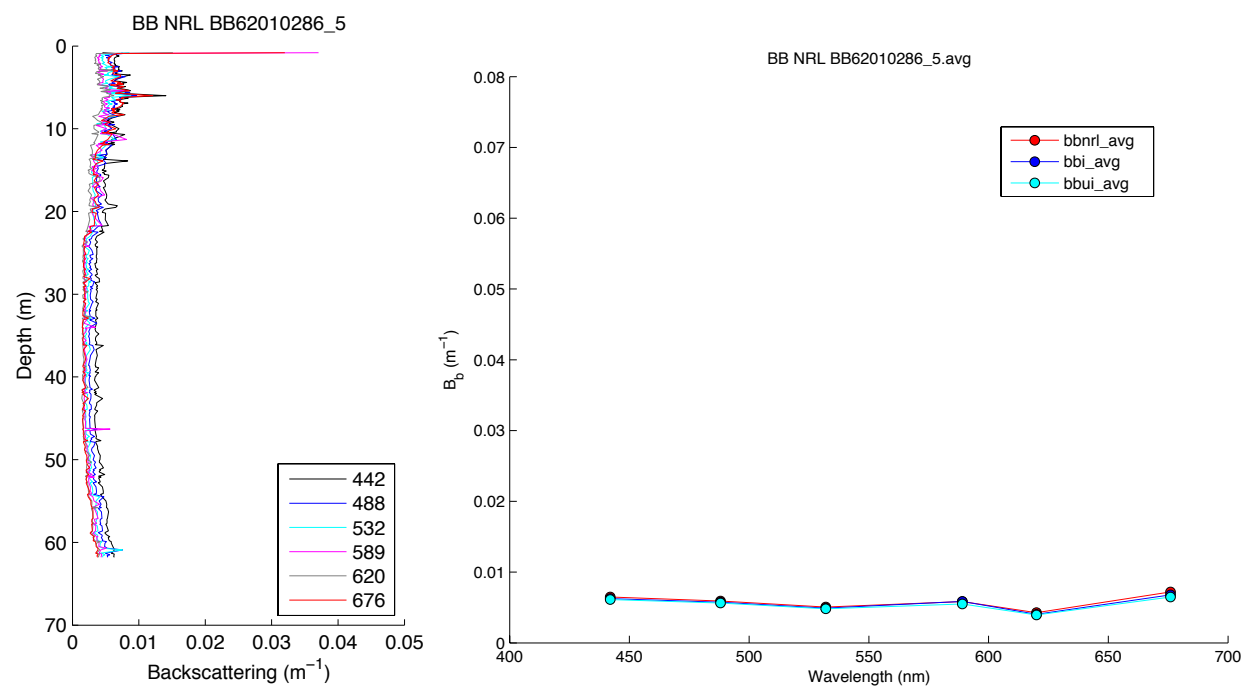
LISST – Cast 07



Optics Profile Package

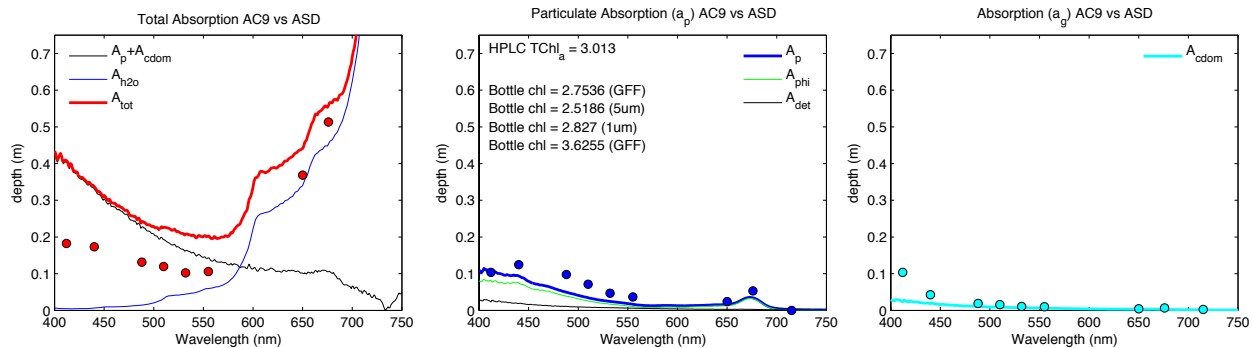


HydroScat

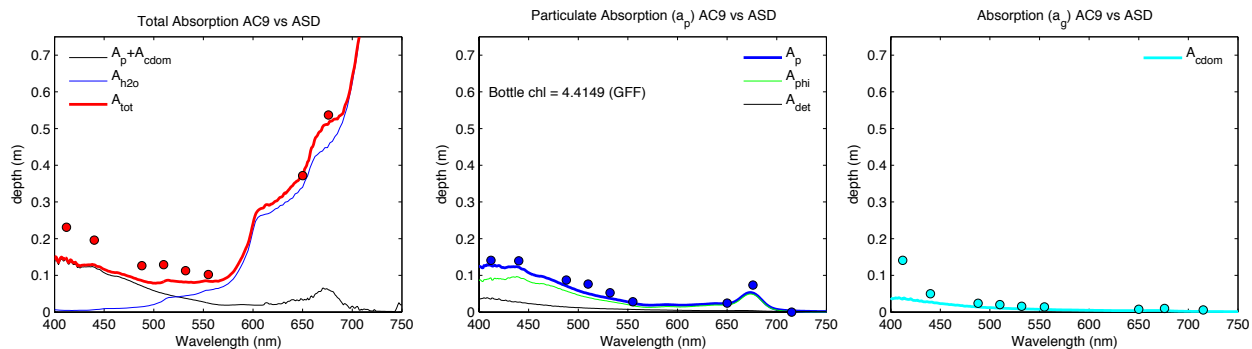


Filter Pad Absorption (w/ AC9)

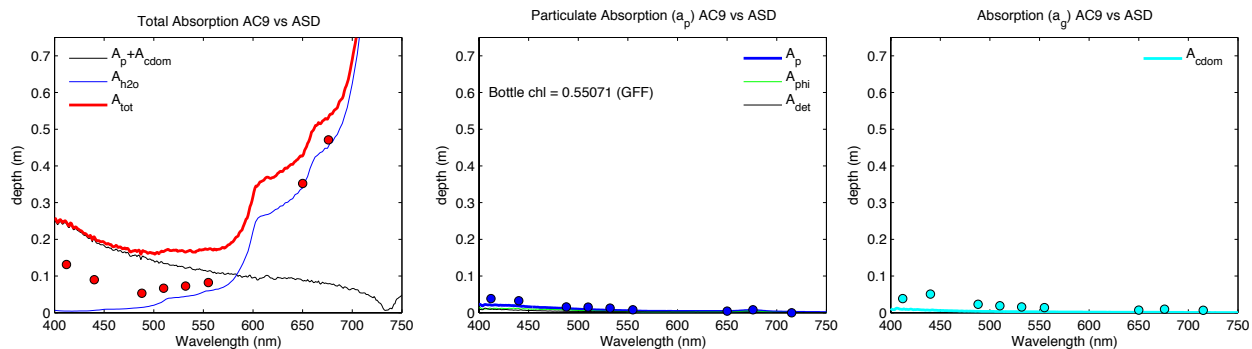
AC9 vs ASD Cast 7 – 0m (PRF2010286_5_corr.dat) NRL s2



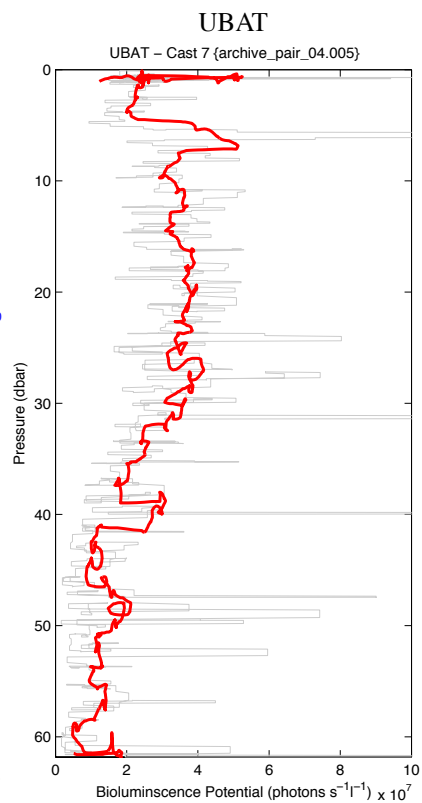
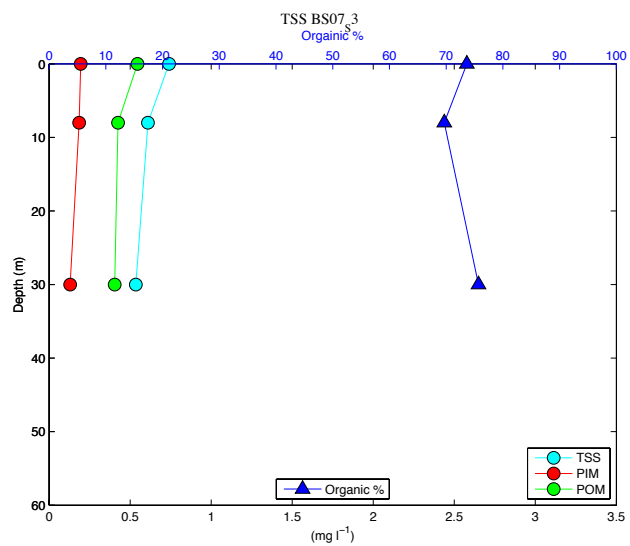
AC9 vs ASD Cast 7 – 8m (PRF2010286_5_corr.dat) NRL s2



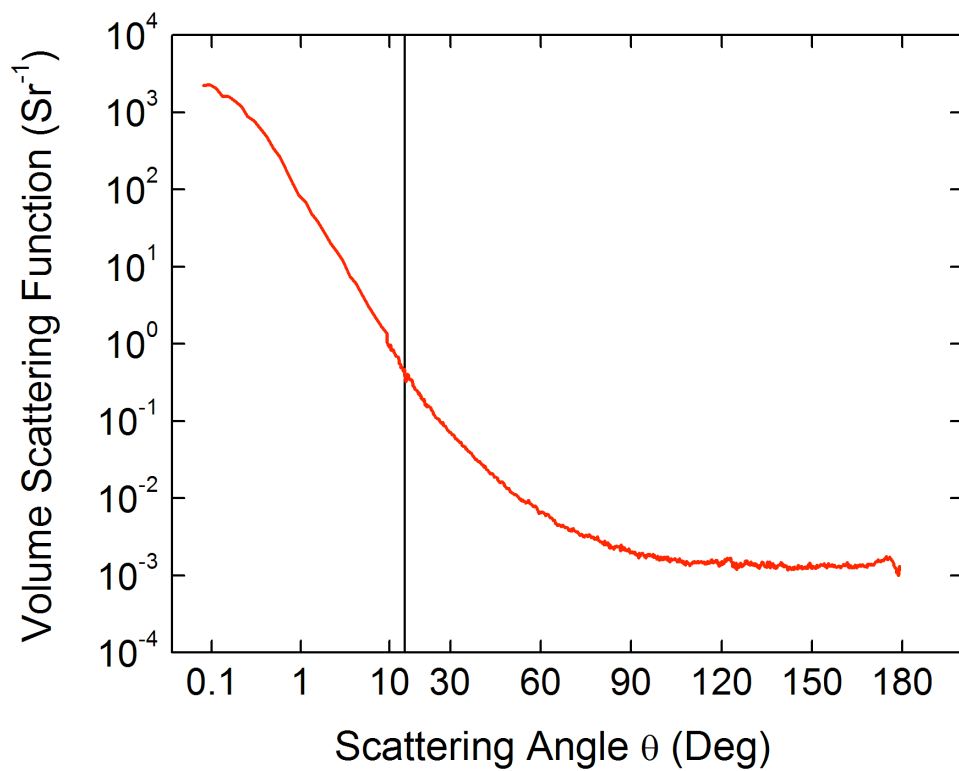
AC9 vs ASD Cast 7 – 30m (PRF2010286_5_corr.dat) NRL s2



TSS



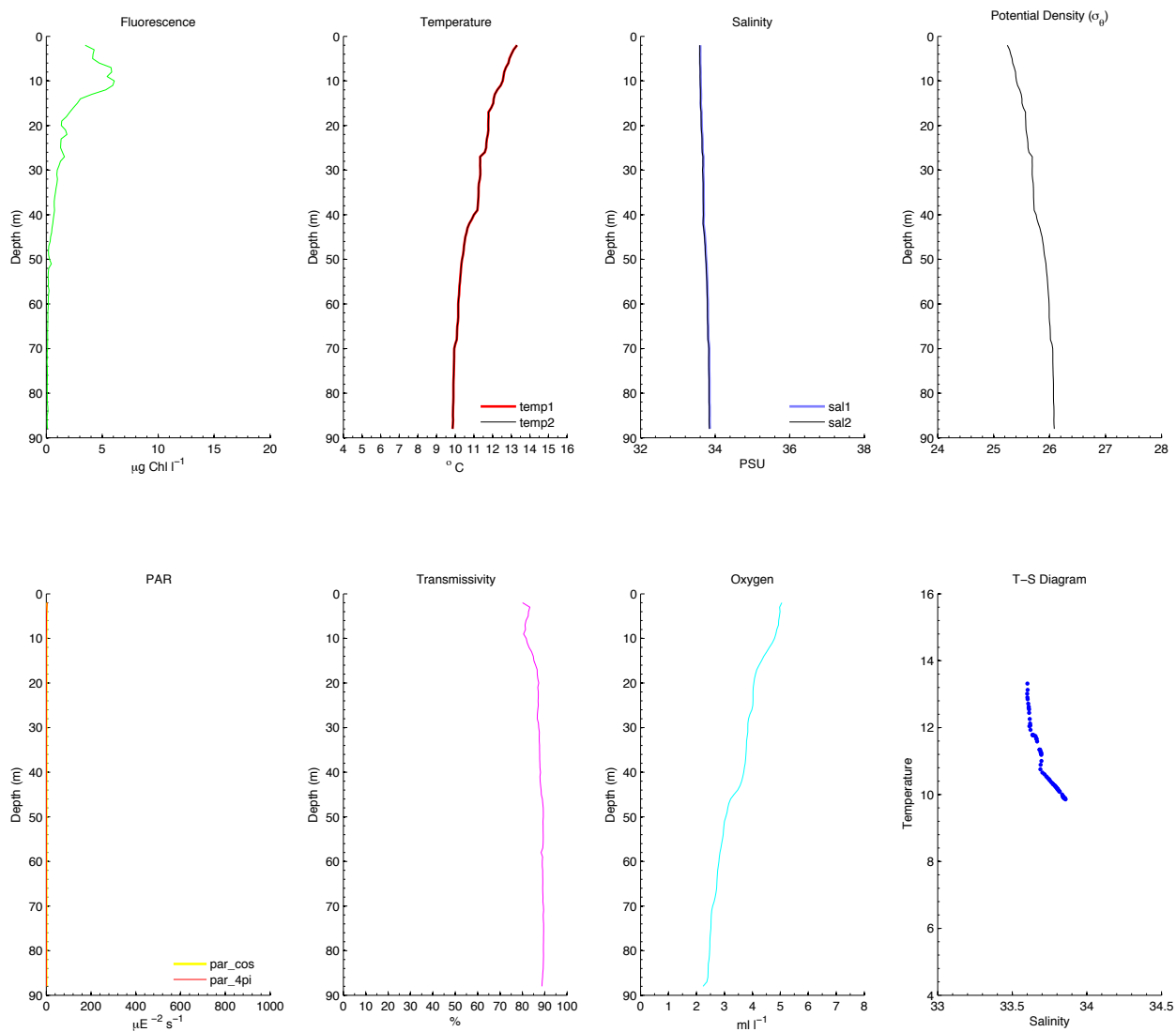
MVSC (532 nm)



Cast 8 (1940 PDT; [NRL Mooring S4](#))
(foggy)

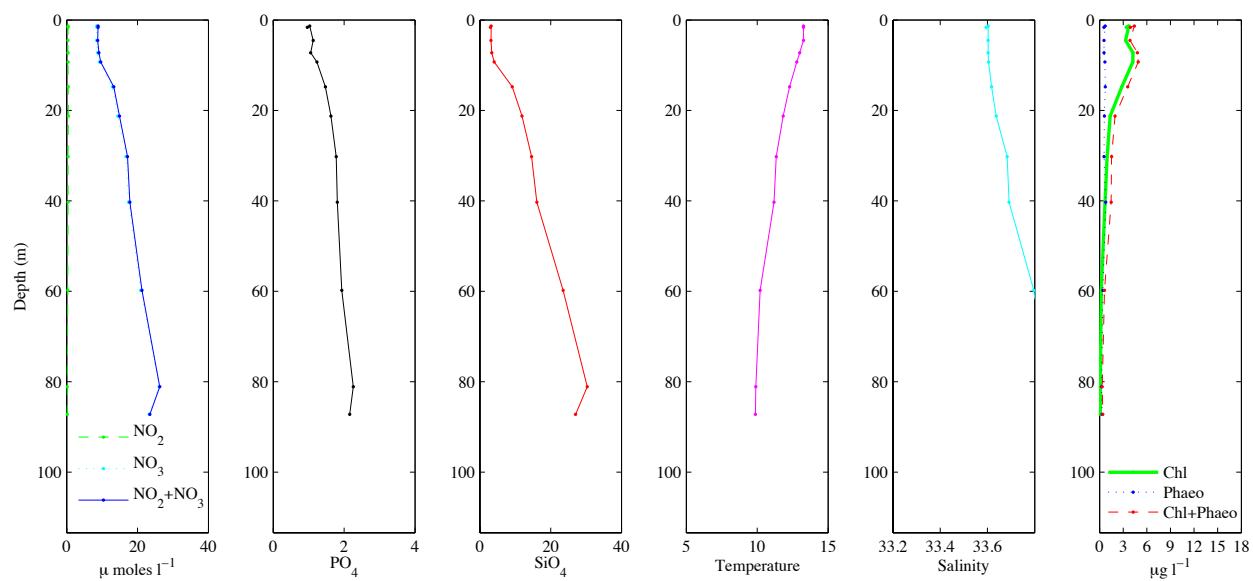
CTD

BIOSPACE 2010 Cast 8 (S4; 2010-10-13 02:40:00.000 UTC) CTD Downcast Data (Calibrated)



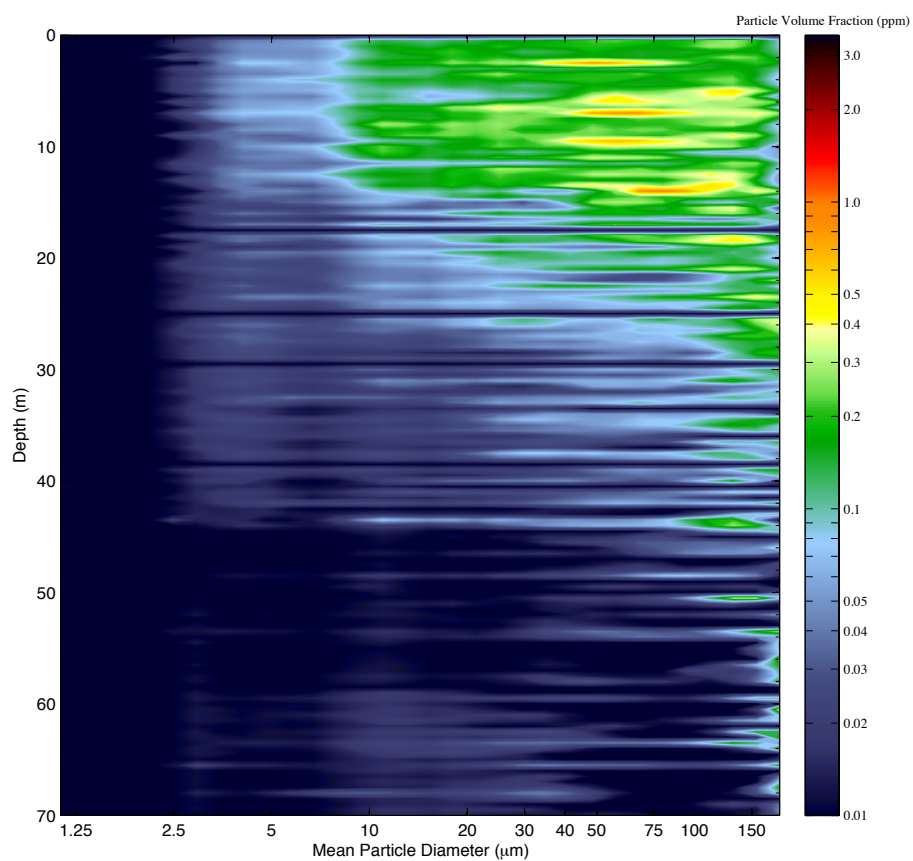
Bottle Nutrients and Chlorophyll

BIOSPACE 2010 Cast 8

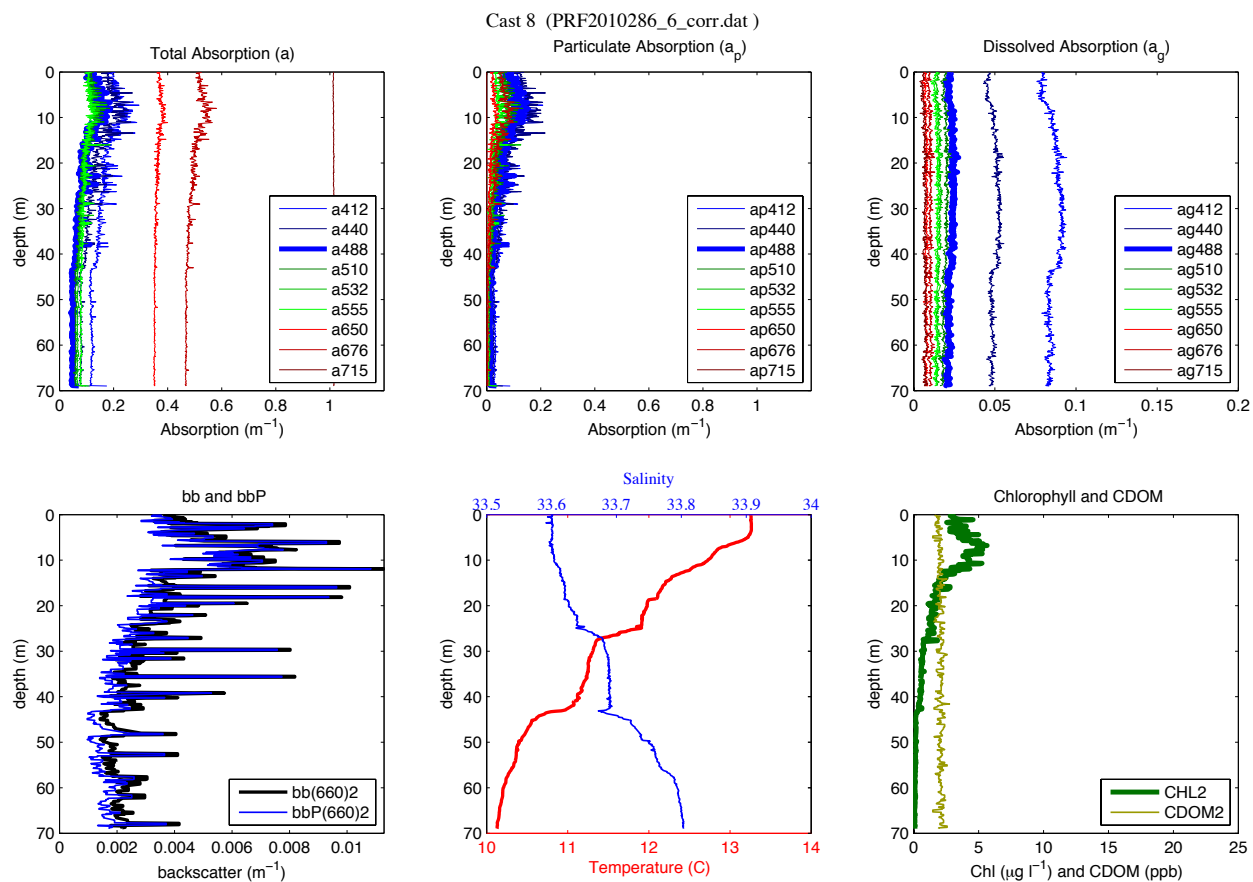


LISST

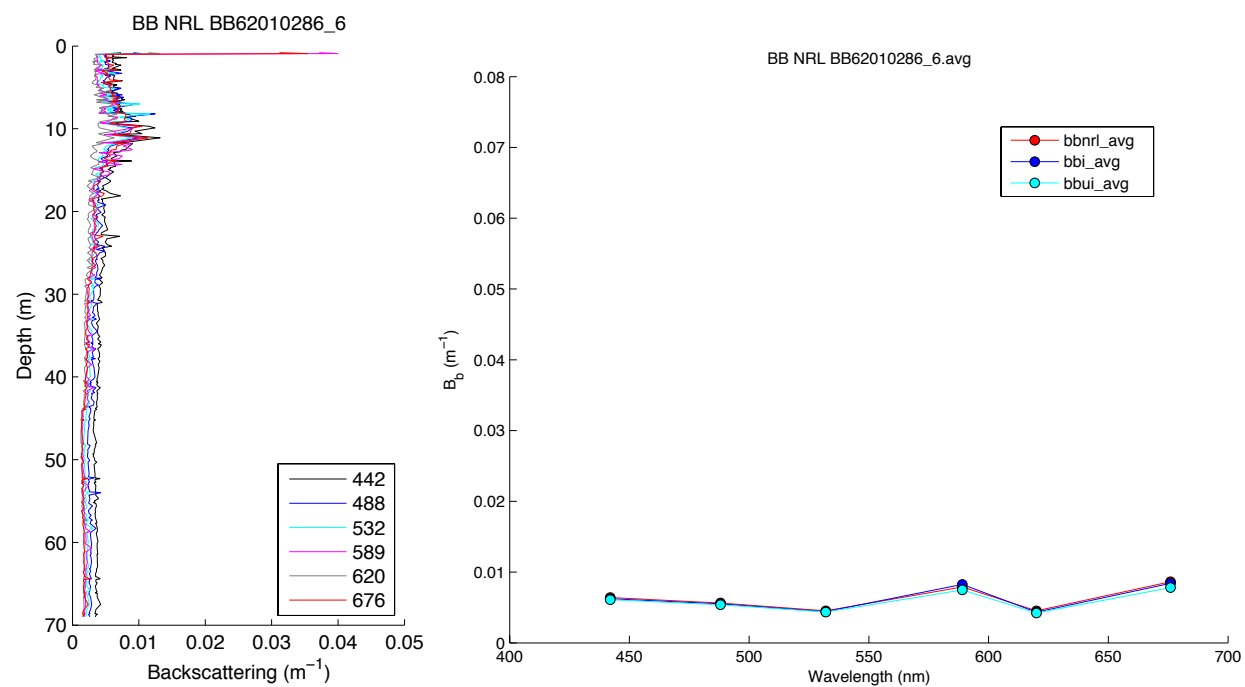
LISST – Cast 08



Optics Profile Package

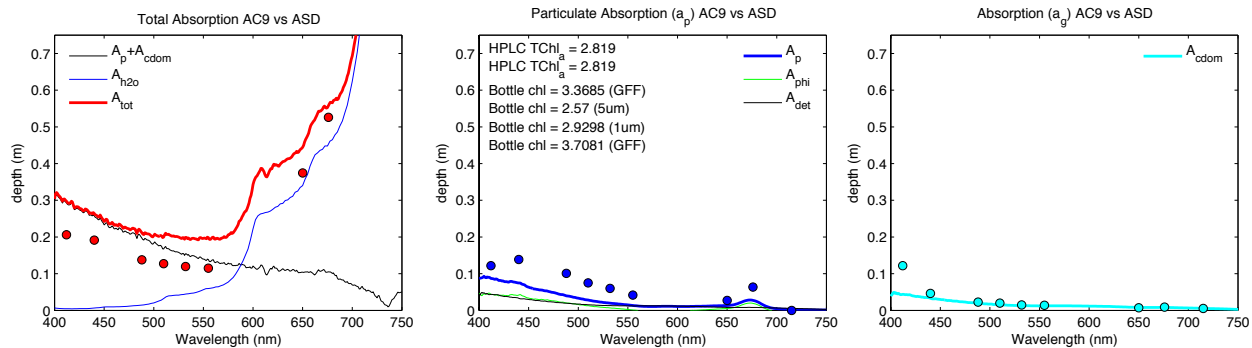


HydroScat

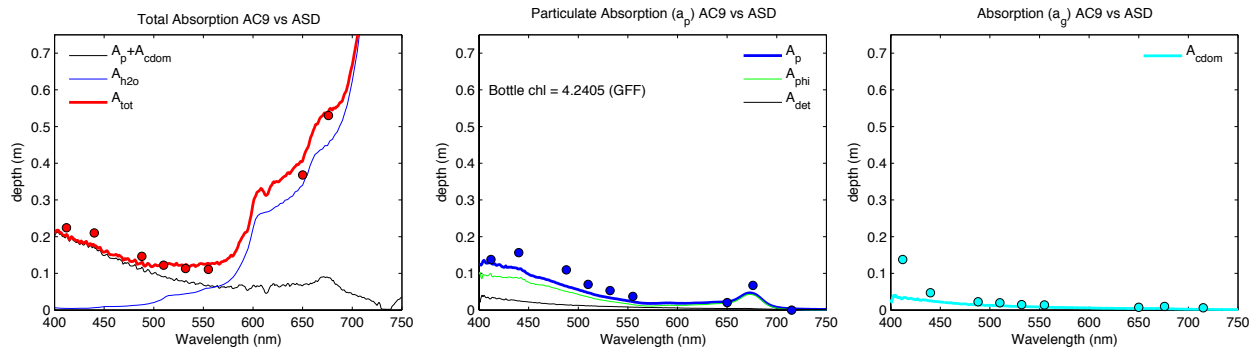


Filter Pad Absorption (w/ AC9)

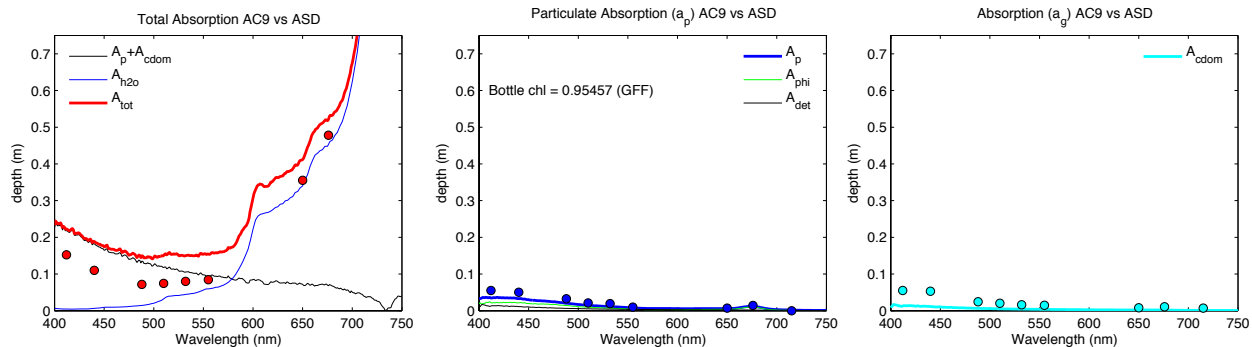
AC9 vs ASD Cast 8 – 0m (PRF2010286_6_corr.dat) NRL s3



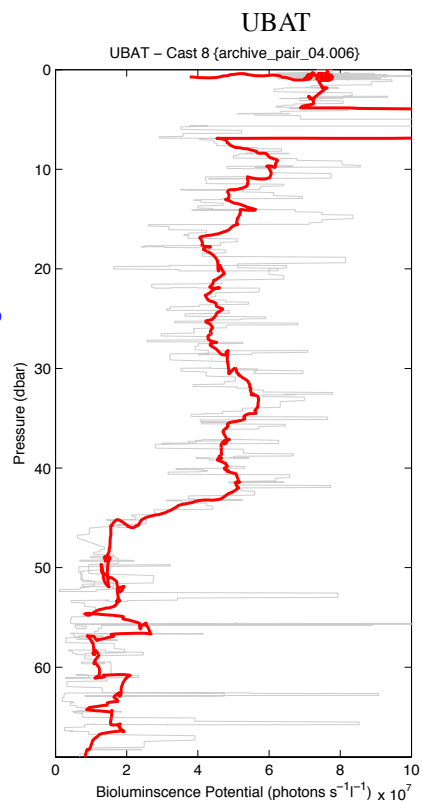
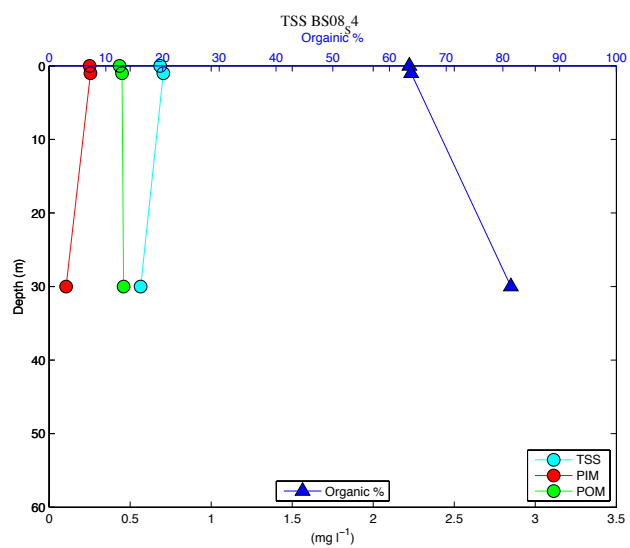
AC9 vs ASD Cast 8 – 7m (PRF2010286_6_corr.dat) NRL s3



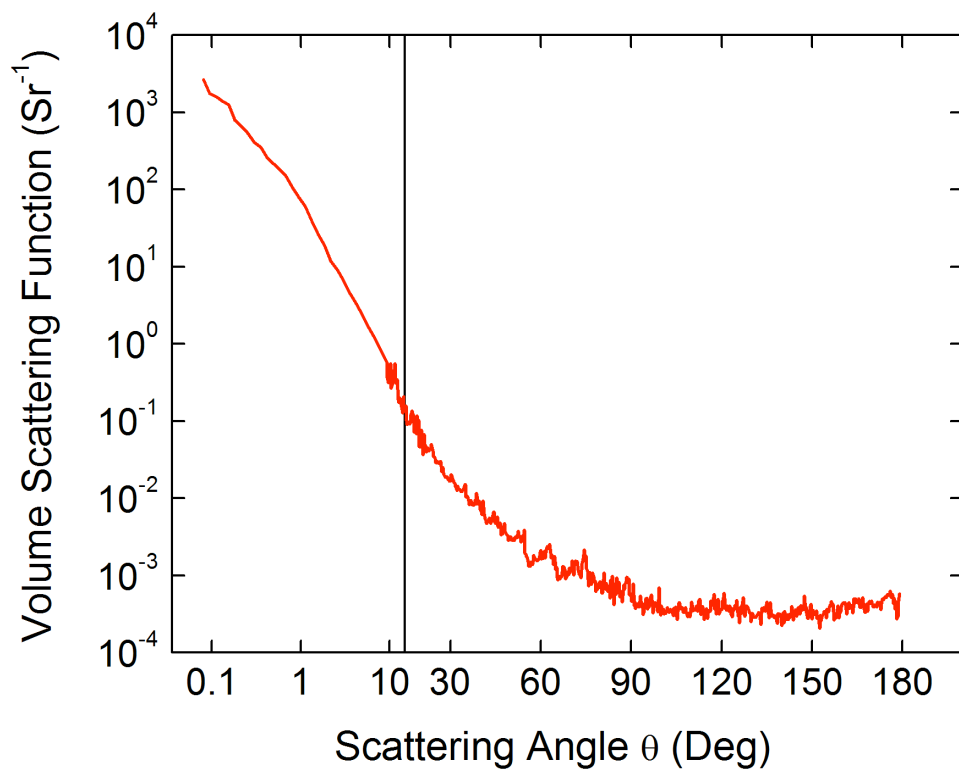
AC9 vs ASD Cast 8 – 30m (PRF2010286_6_corr.dat) NRL s3



TSS



MVSC (532 nm)



10/13

(relaxation) Bloom still visible at surface, but less widespread. *Pseudo-nitzschia* below surface (AUV)

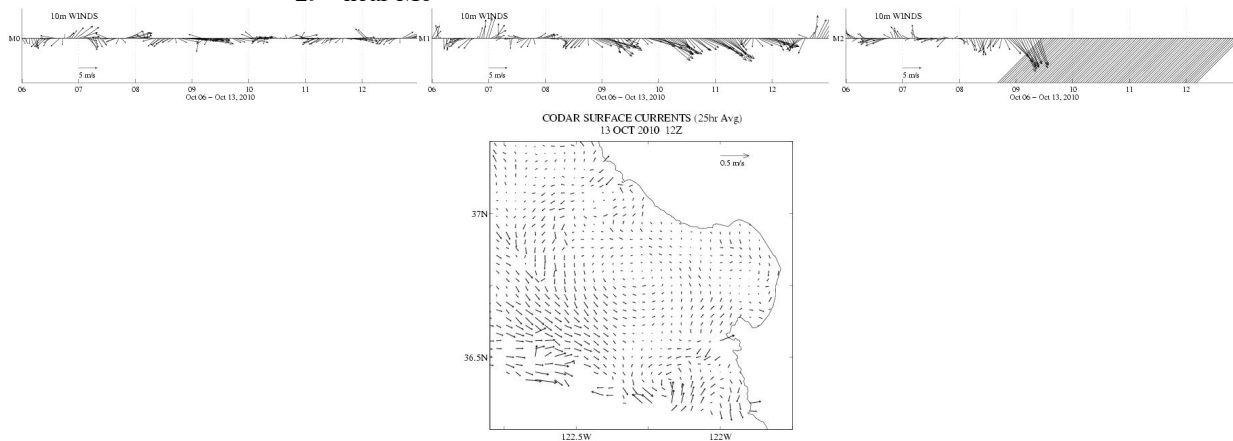
R/V Pt. Sur - Scanfish offshore and Flow-through samples taken at stations:

23, 22, 21, 20 - offshore (M2 between 21 and 22)

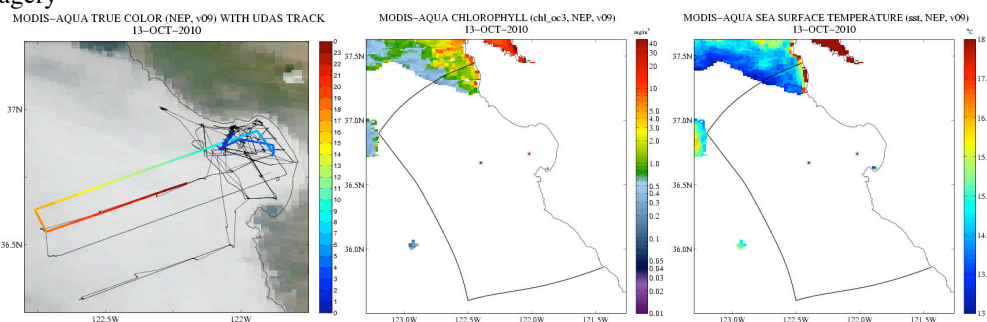
11 - near M1

28 - inside MB

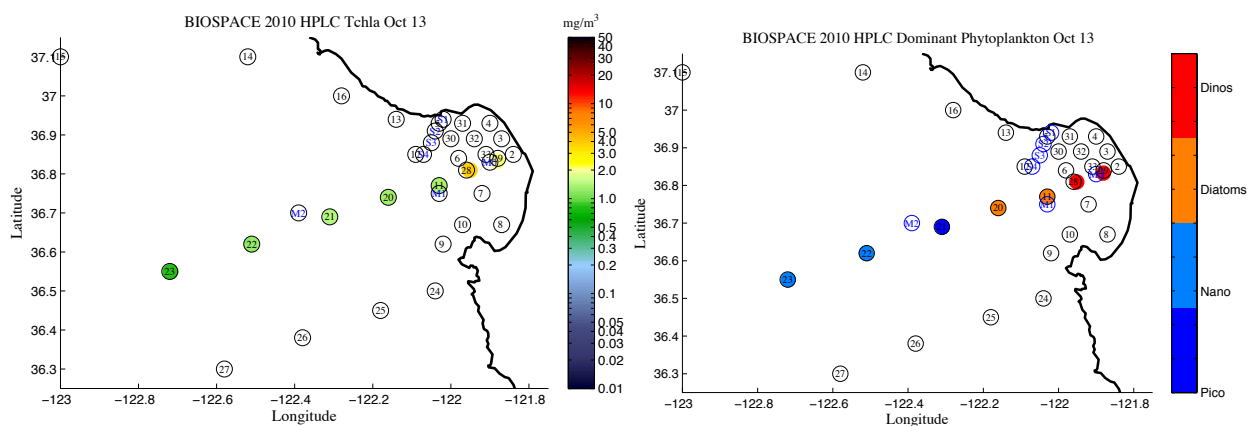
29 - near M0



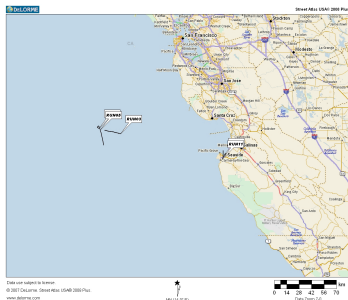
Satellite Imagery



HPLC



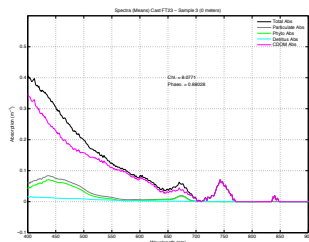
Aircraft Flight-lines



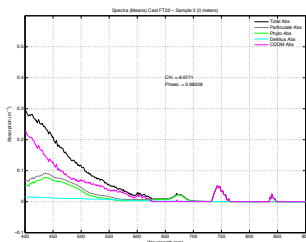
PHILLS Caption: Marine layer was covering all of the Bay except for a small part near Monterey. The NRL ship Pt Sur was towing a scanfish with absorption and backscatter sensor and was due to be at scanfish points 17 and 20 (furthest from shore) at the time of our flight. We decided to fly out to those points to see if they were free of fog. Turns out they weren't, but we did fly out a few more miles into fog free water. Once there, we did a few runs and collected some data. We also decided to try something new and that was to point the stage at $P = -30$ degrees, opposite the plane direction of motion when flying into the Sun. The stage was then put in sweep mode at $p = -30$ degrees. After the deep water observation was completed we flew to the South part of the Bay to make measurements of the water.

Filter Pad Absorption

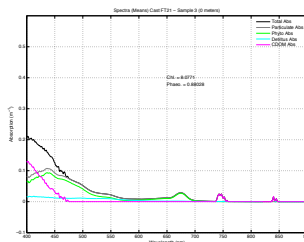
FT @ [23](#) (1100 PDT)



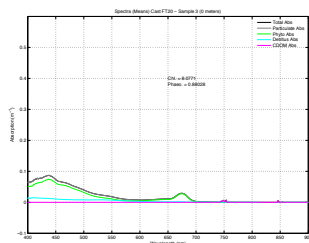
FT @ [22](#) (1324 PDT)



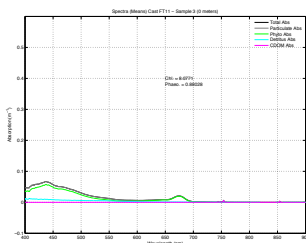
FT @ [21](#) (1536 PDT)



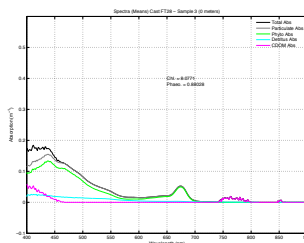
FT @ [20](#) (1730 PDT)



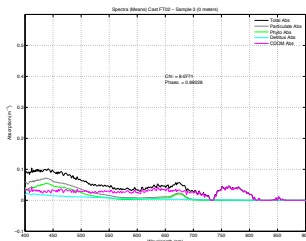
FT @ [11](#) (1845 PDT)



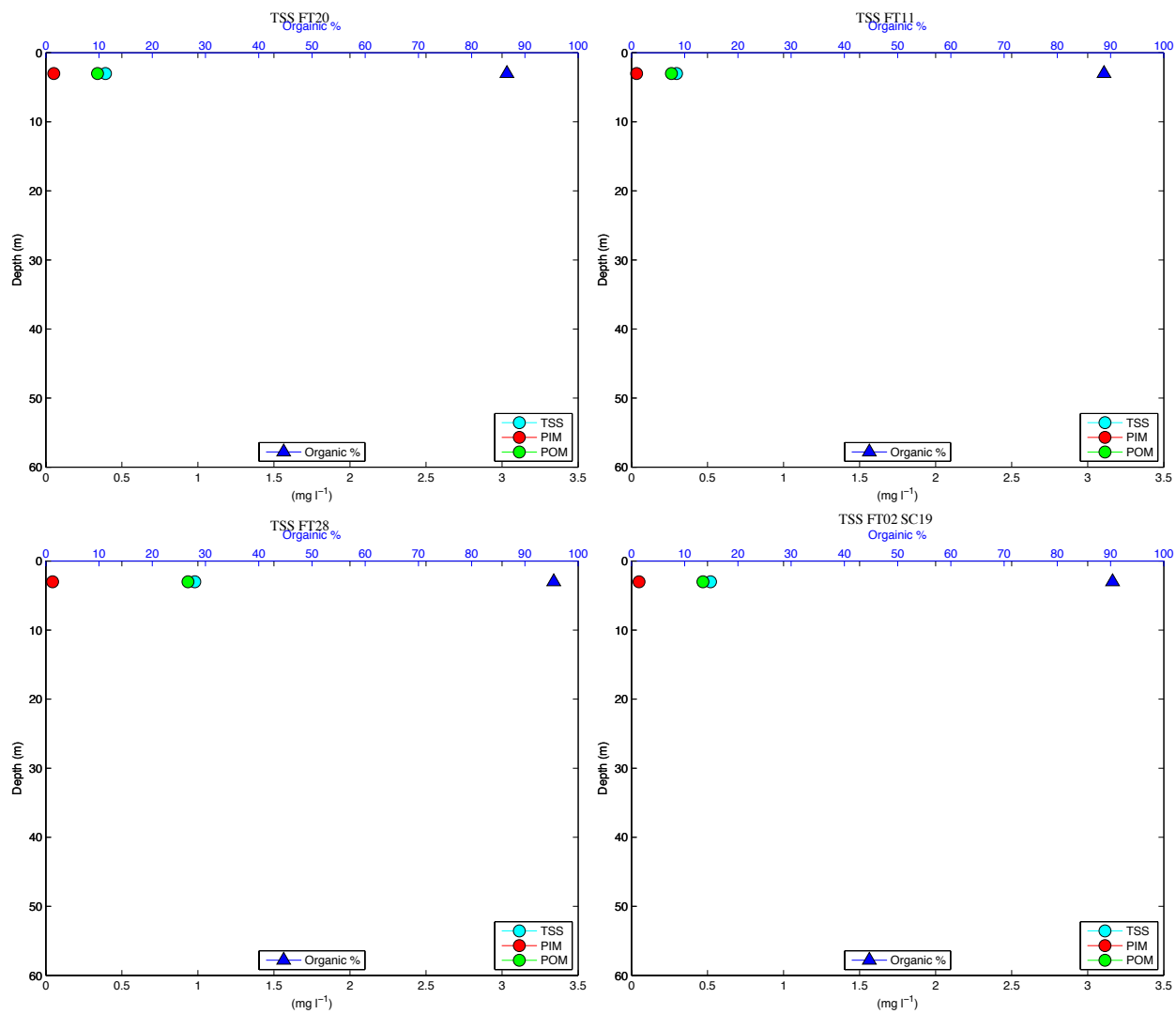
FT @ [28](#) (1940 PDT)



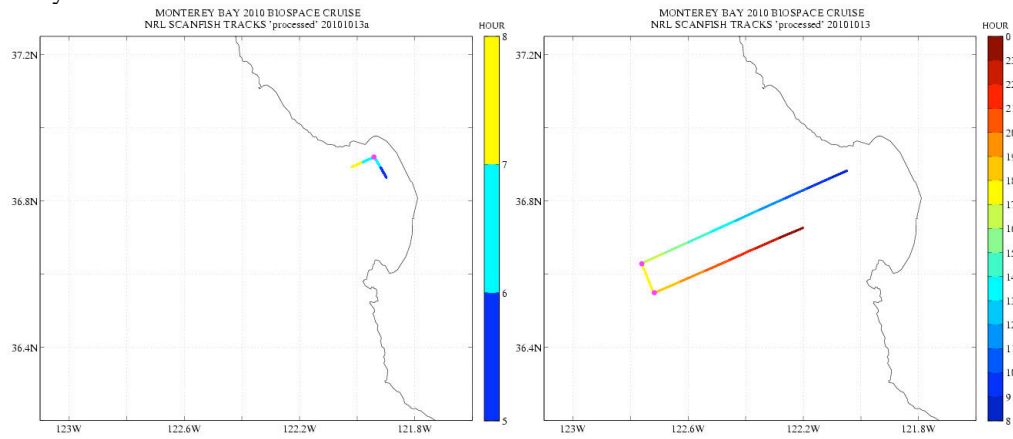
FT @ [29](#) (2023 PDT)



TSS

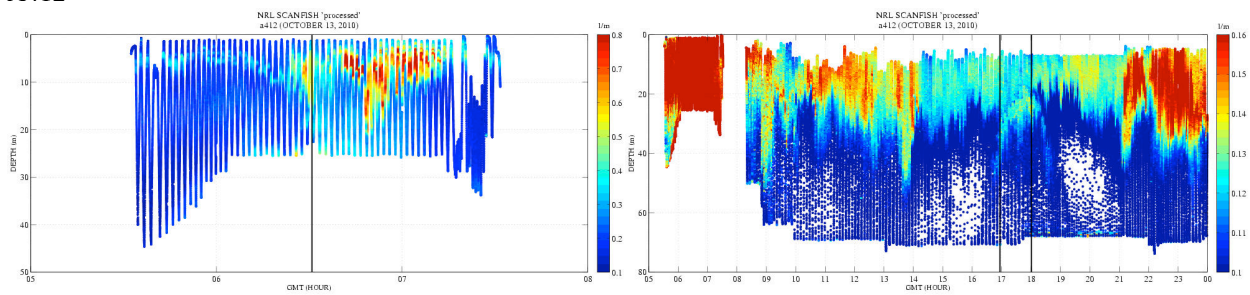


Scanfish Survey

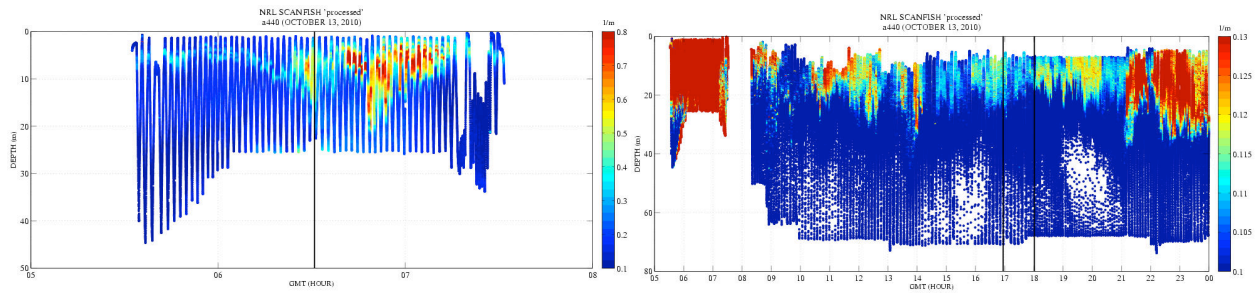


Absorption

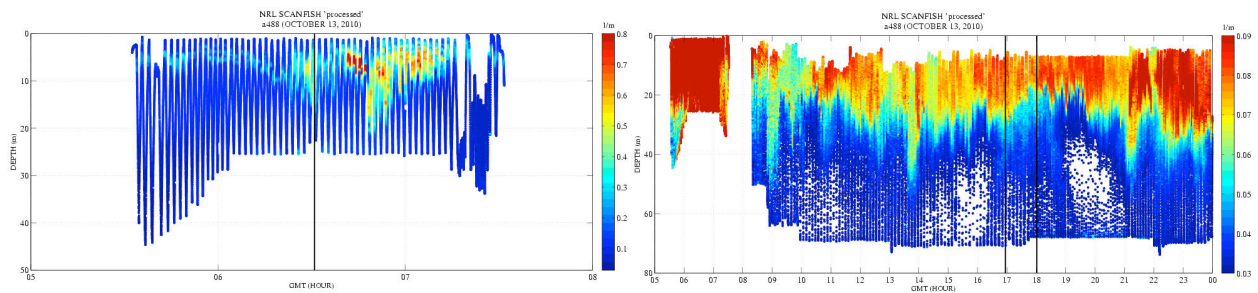
A412



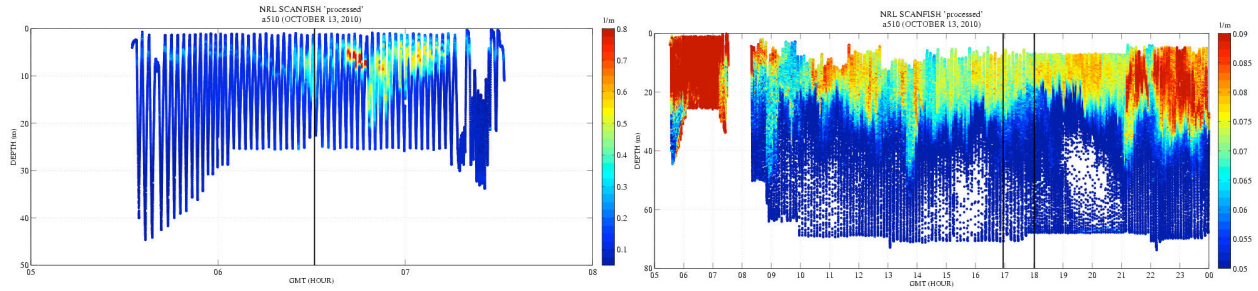
A440



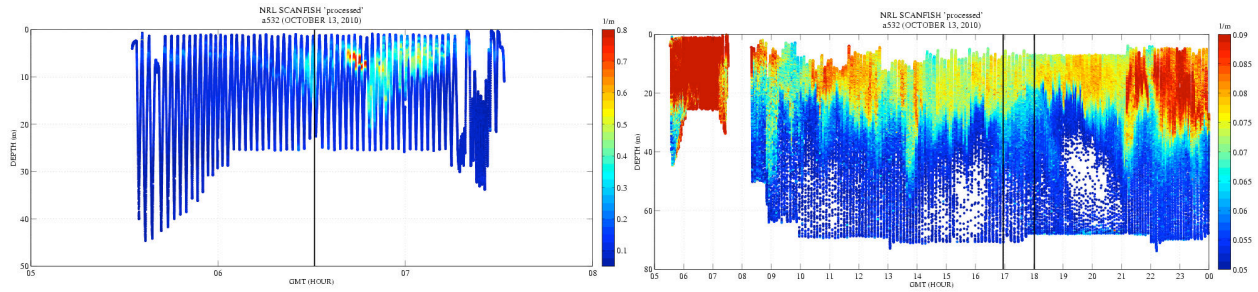
A488



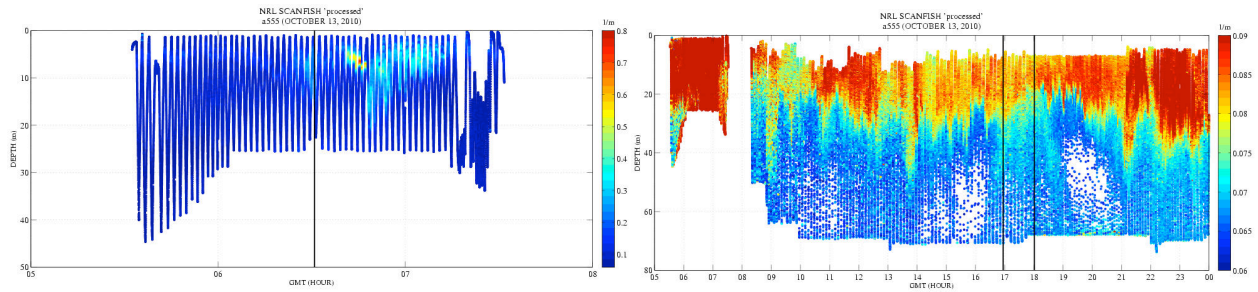
A510



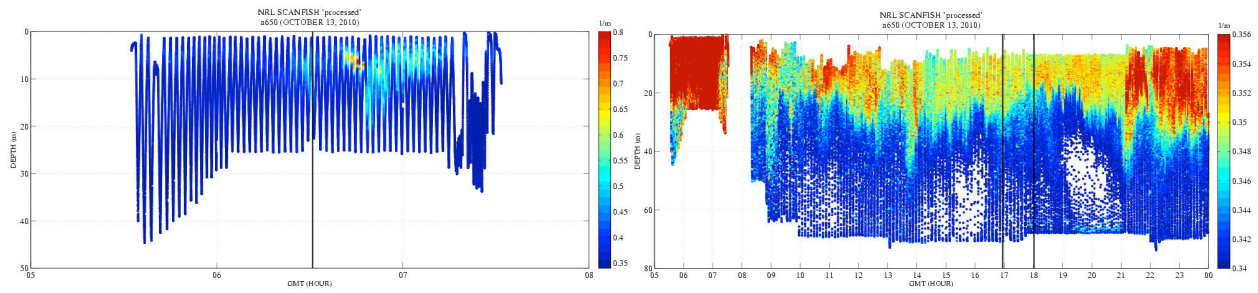
A532



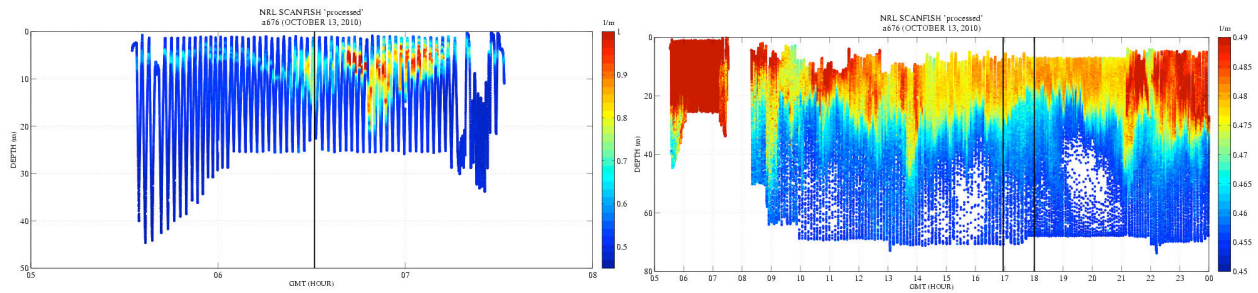
A555



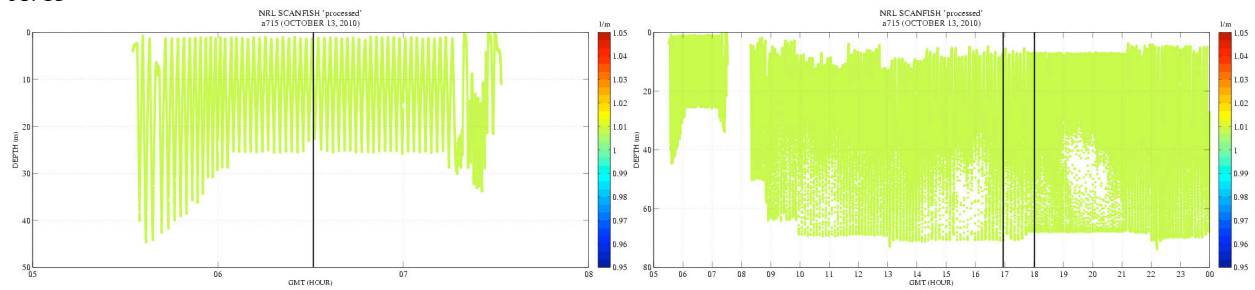
A650



A676

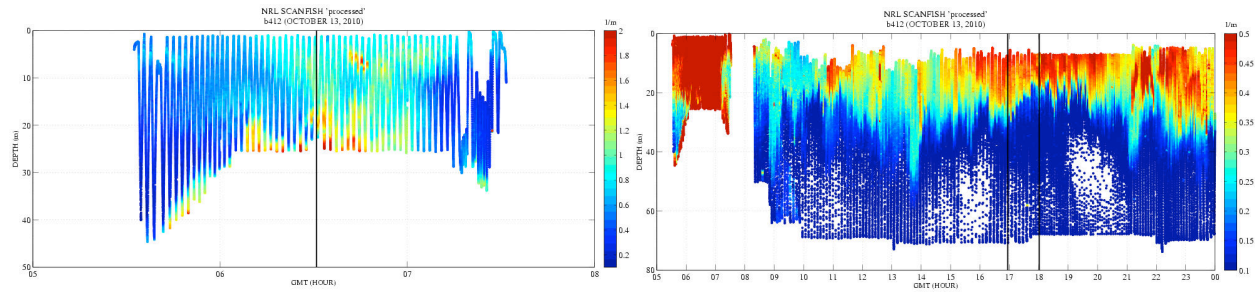


A715

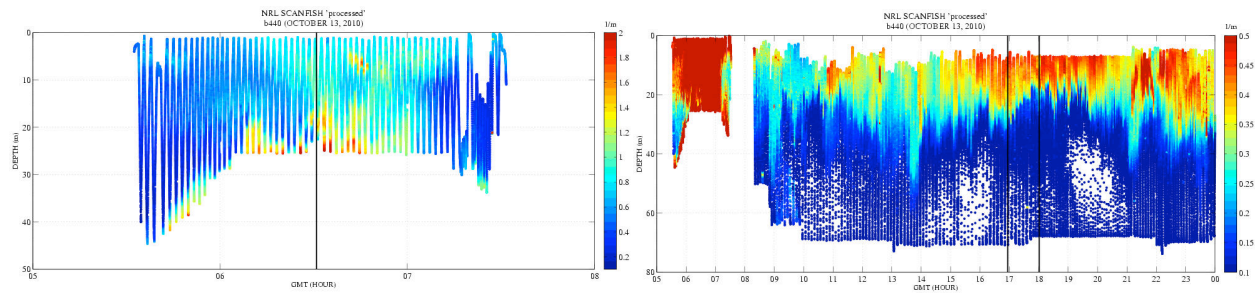


Scattering

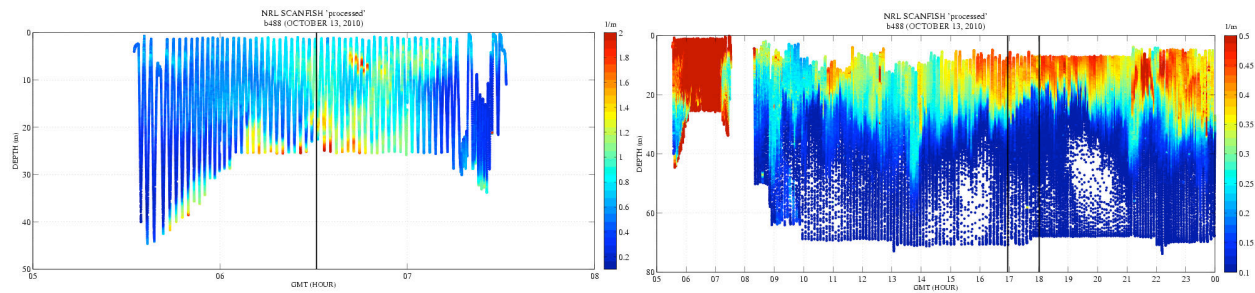
B412



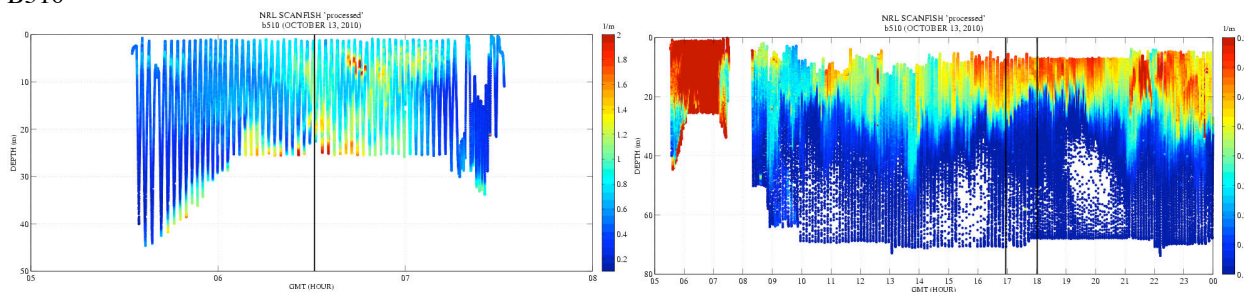
B440



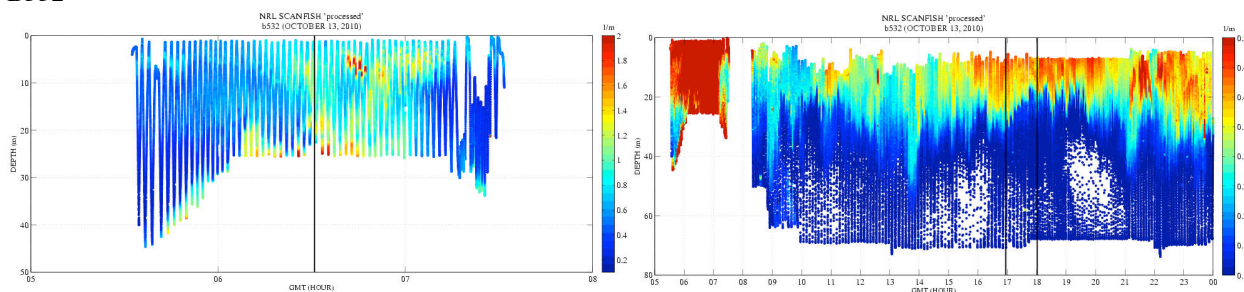
B488



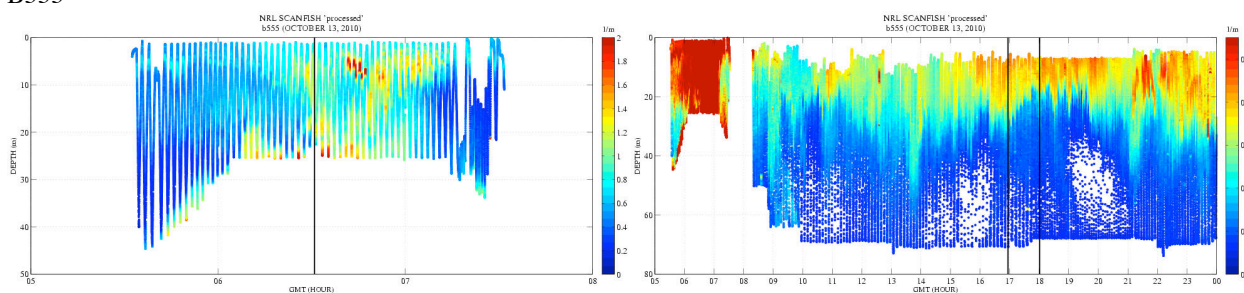
B510



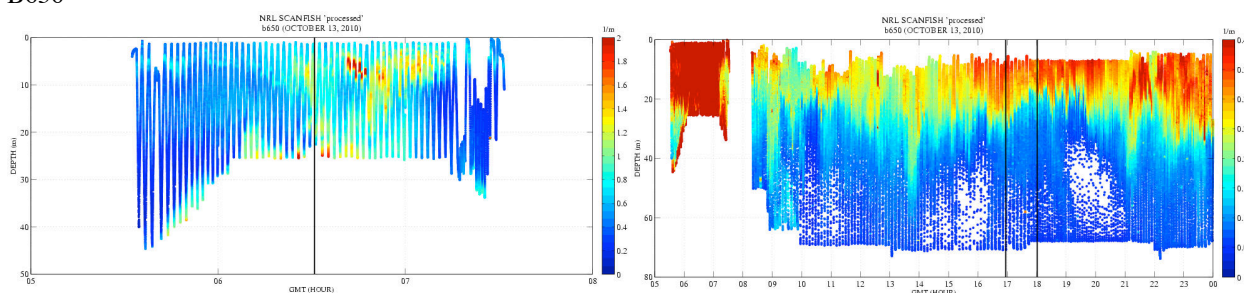
B532



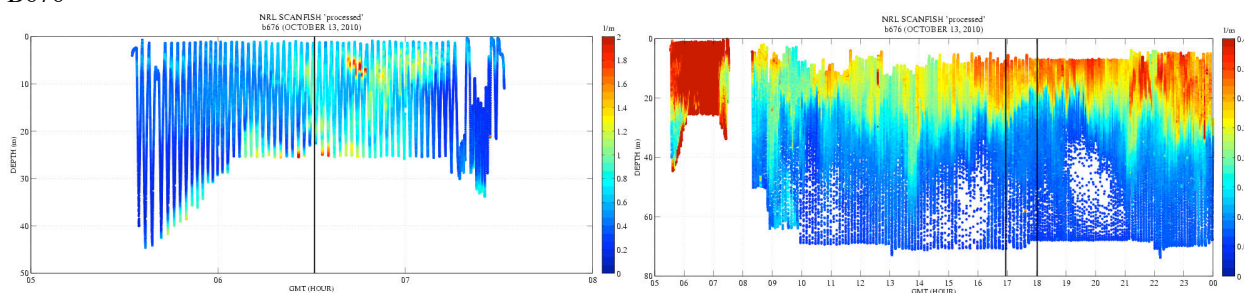
B555



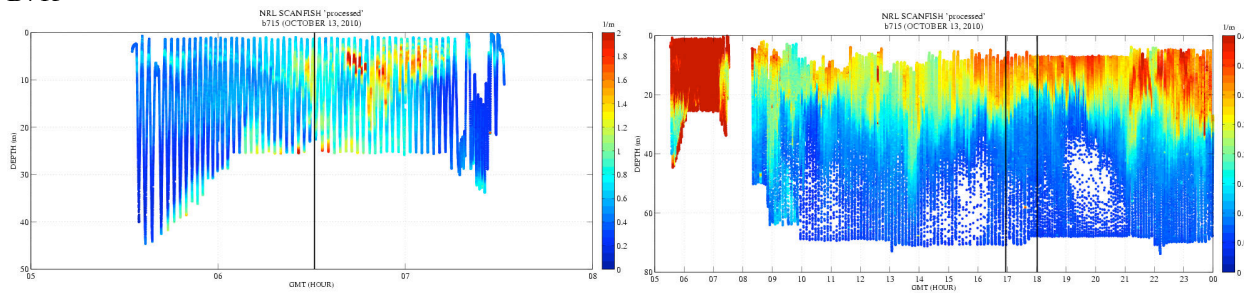
B650



B676

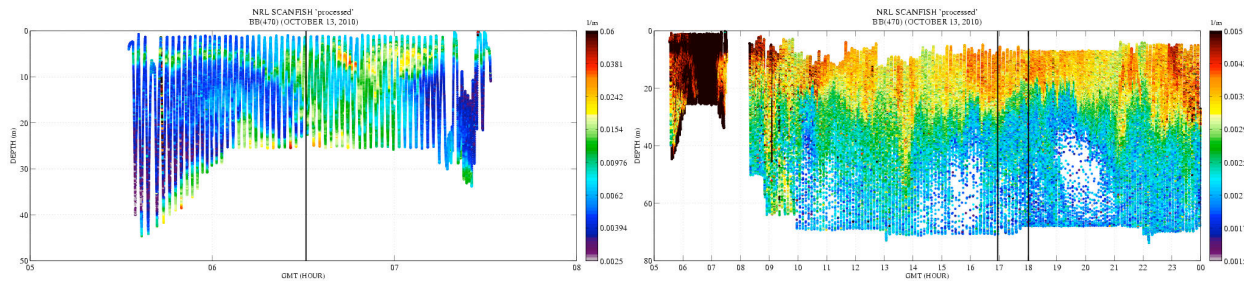


B715

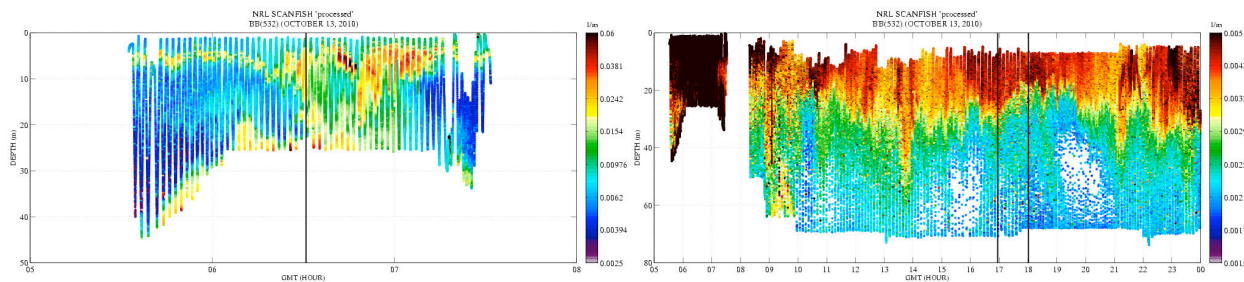


Backscatter

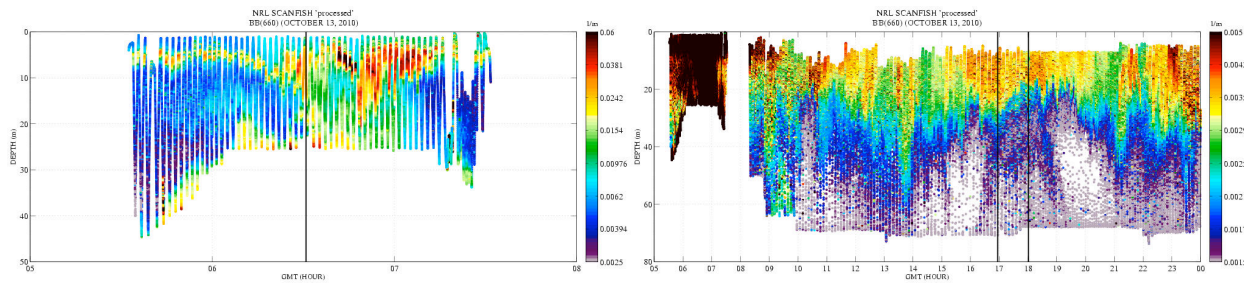
BB470



BB532

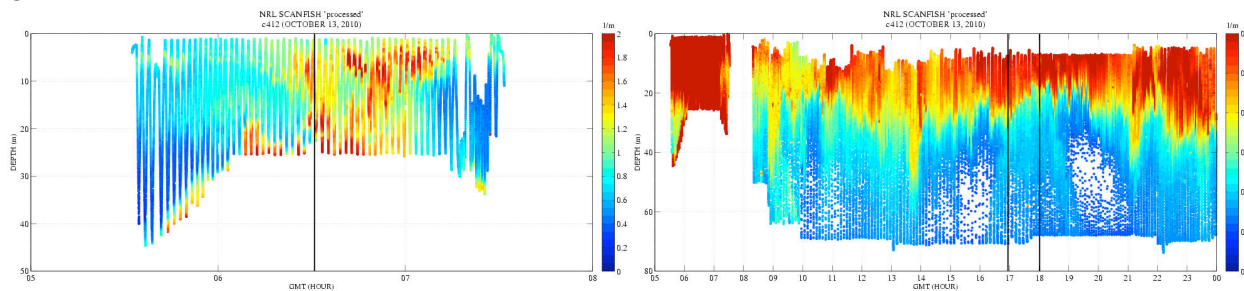


BB660

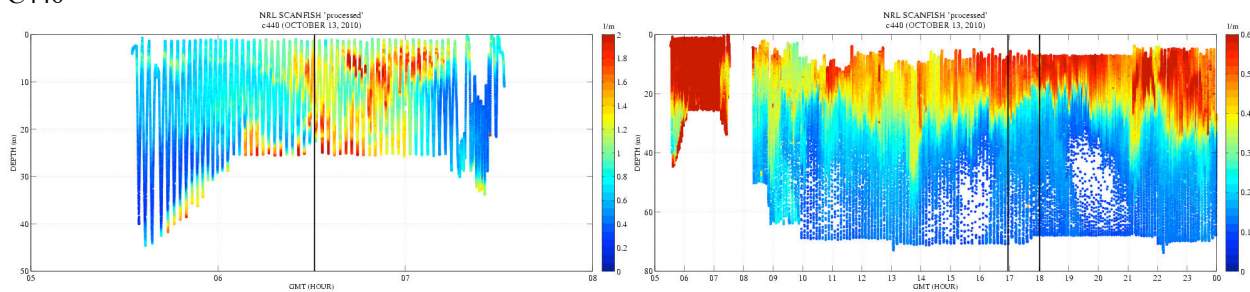


Beam Attenuation

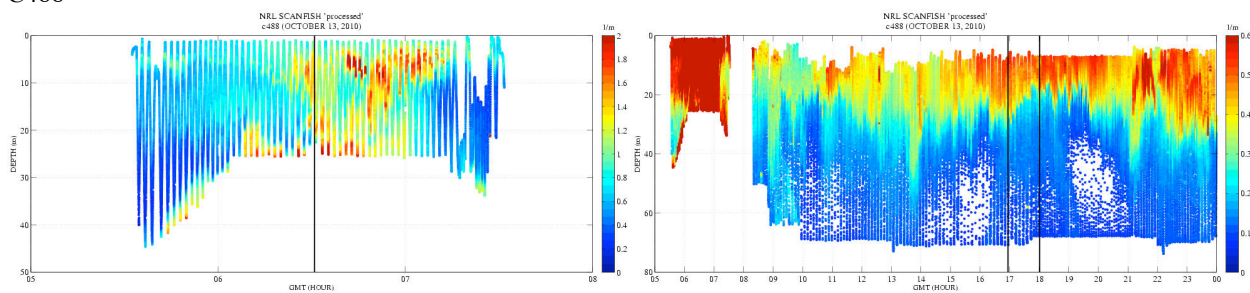
C412



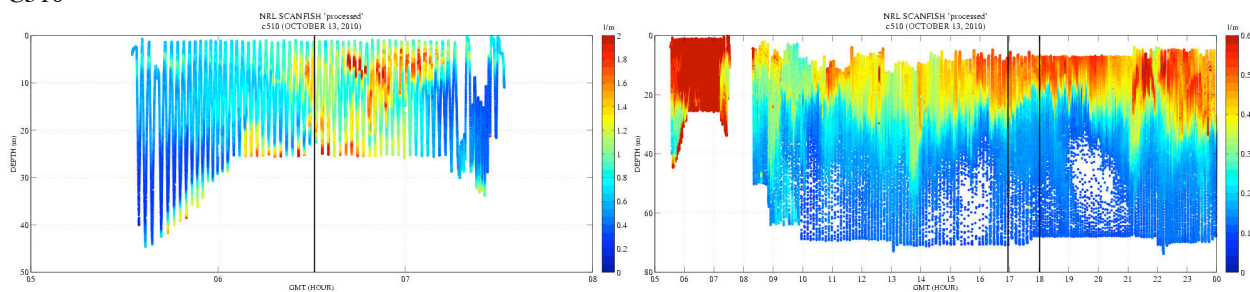
C440



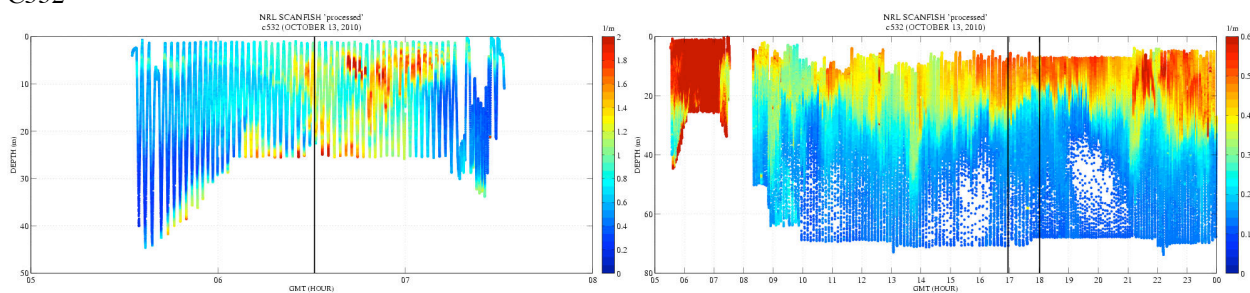
C488



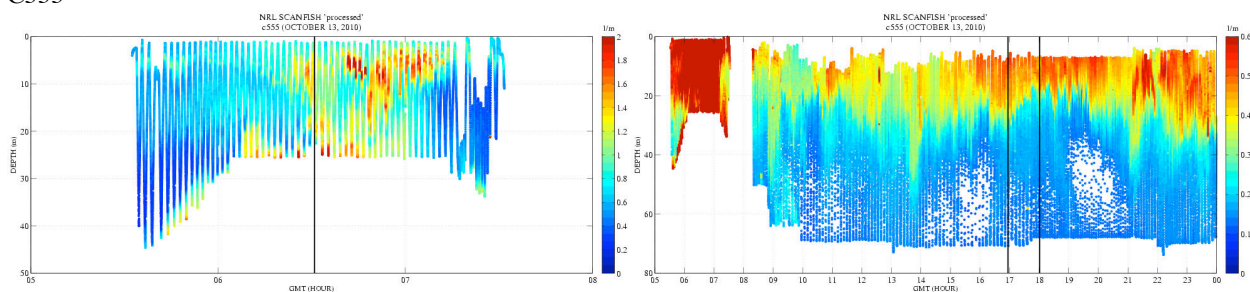
C510



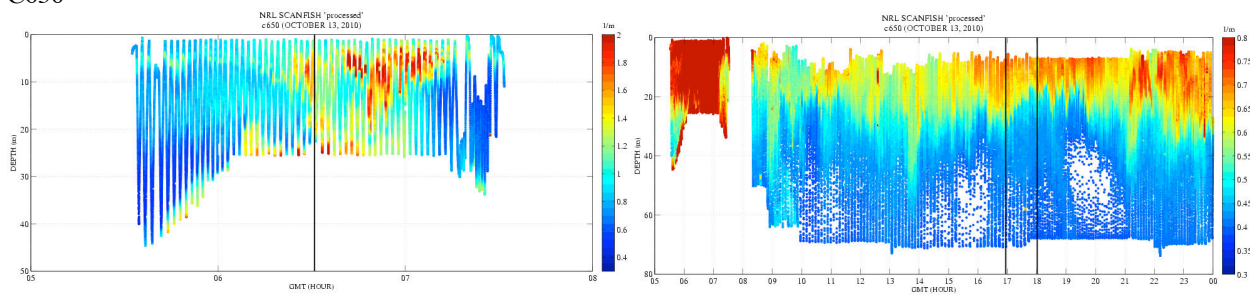
C532



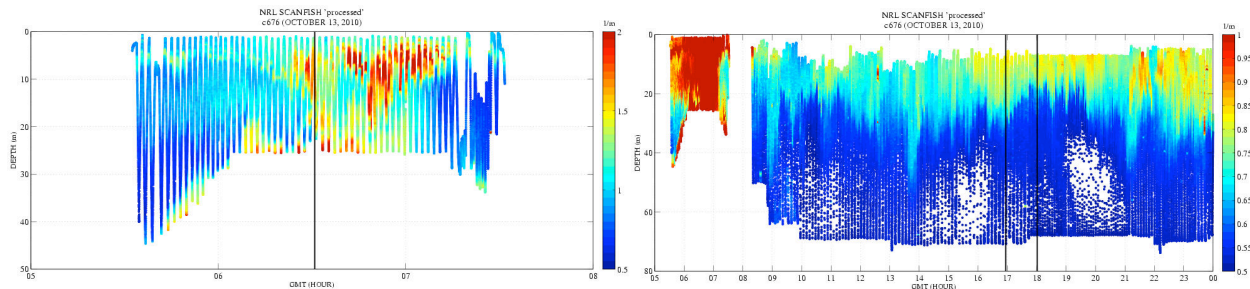
C555



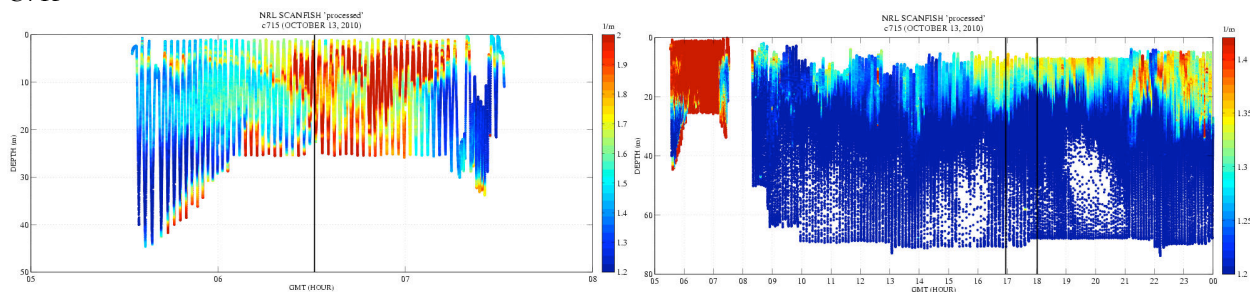
C650



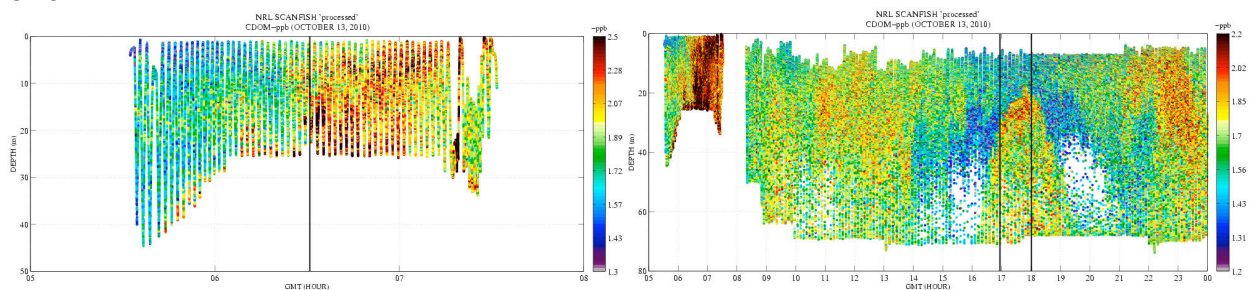
C676



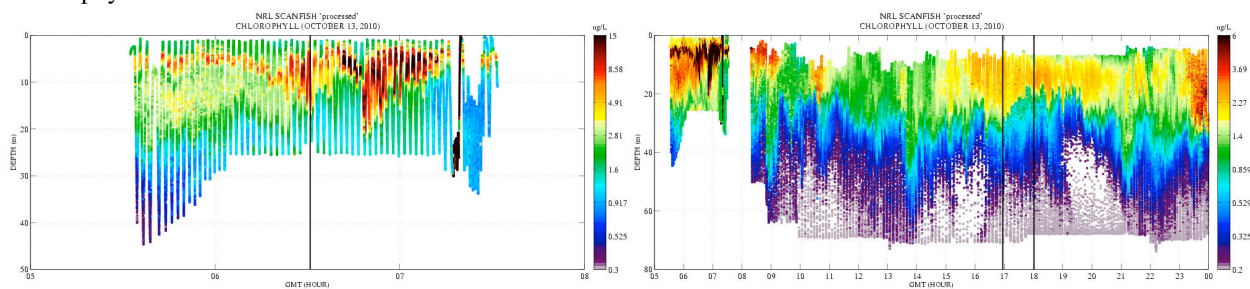
C715



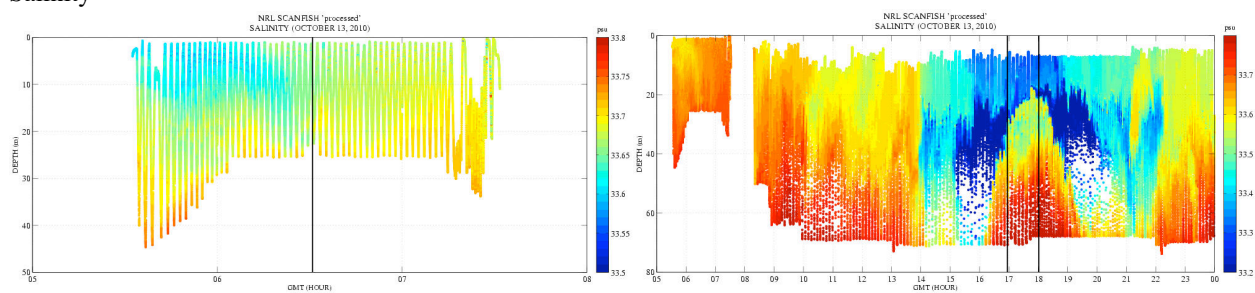
CDOM



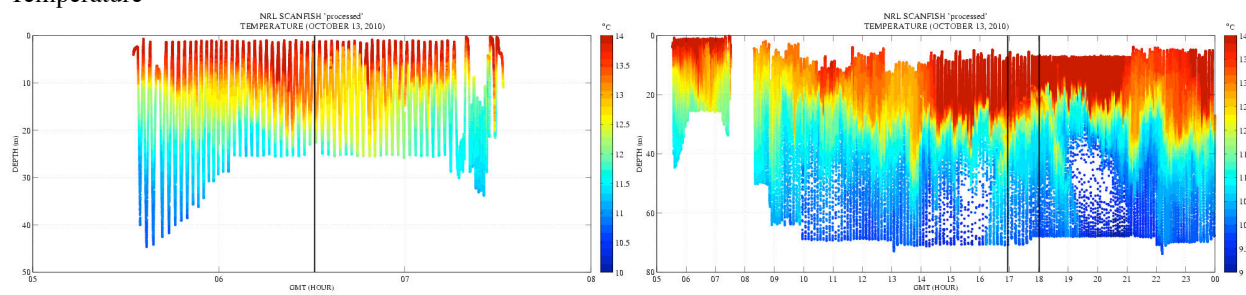
Chlorophyll



Salinity



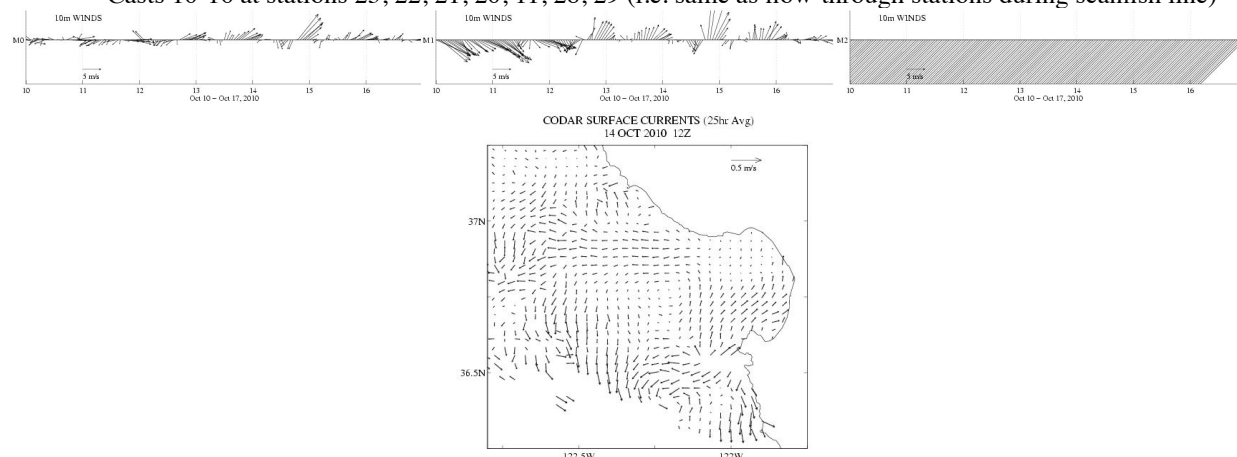
Temperature



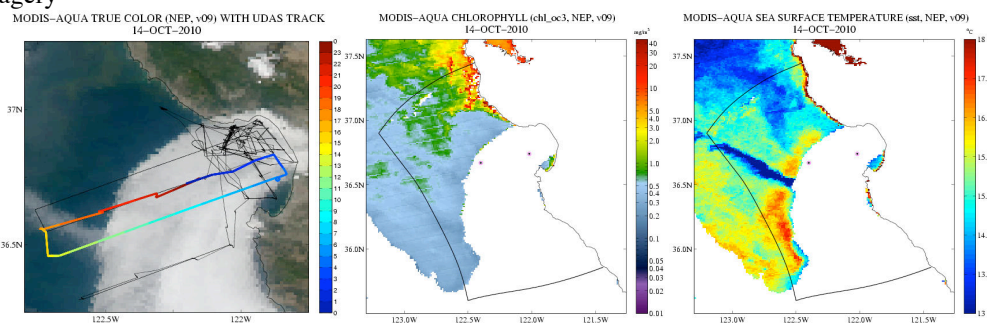
10/14

Scanfish Calibration (Cast 9) offshore (2900 meters water depth)

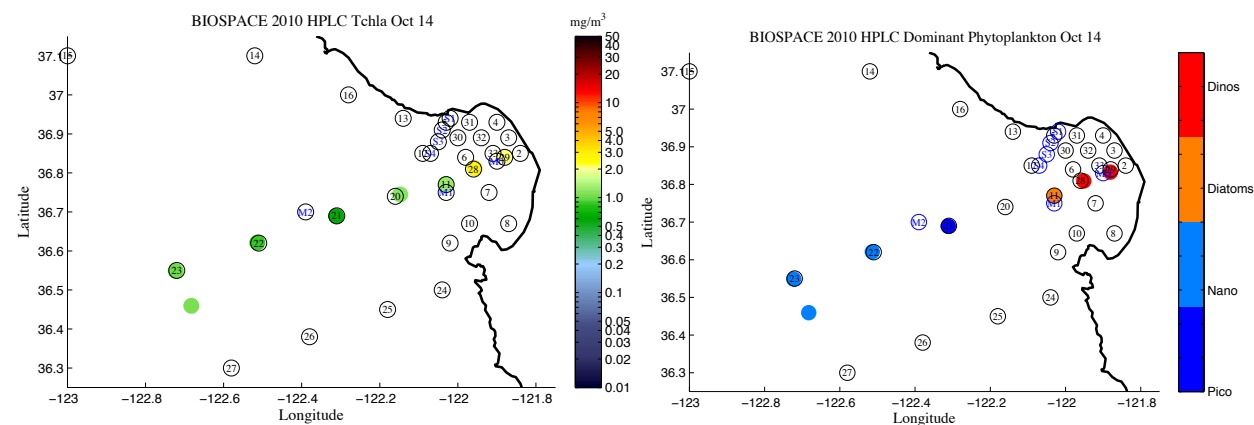
Casts 10-16 at stations 23, 22, 21, 20, 11, 28, 29 (i.e. same as flow-through stations during scanfish line)



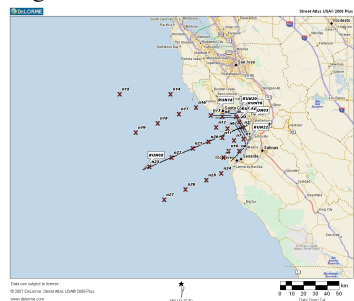
Satellite Imagery



HPLC



Aircraft Flight-lines

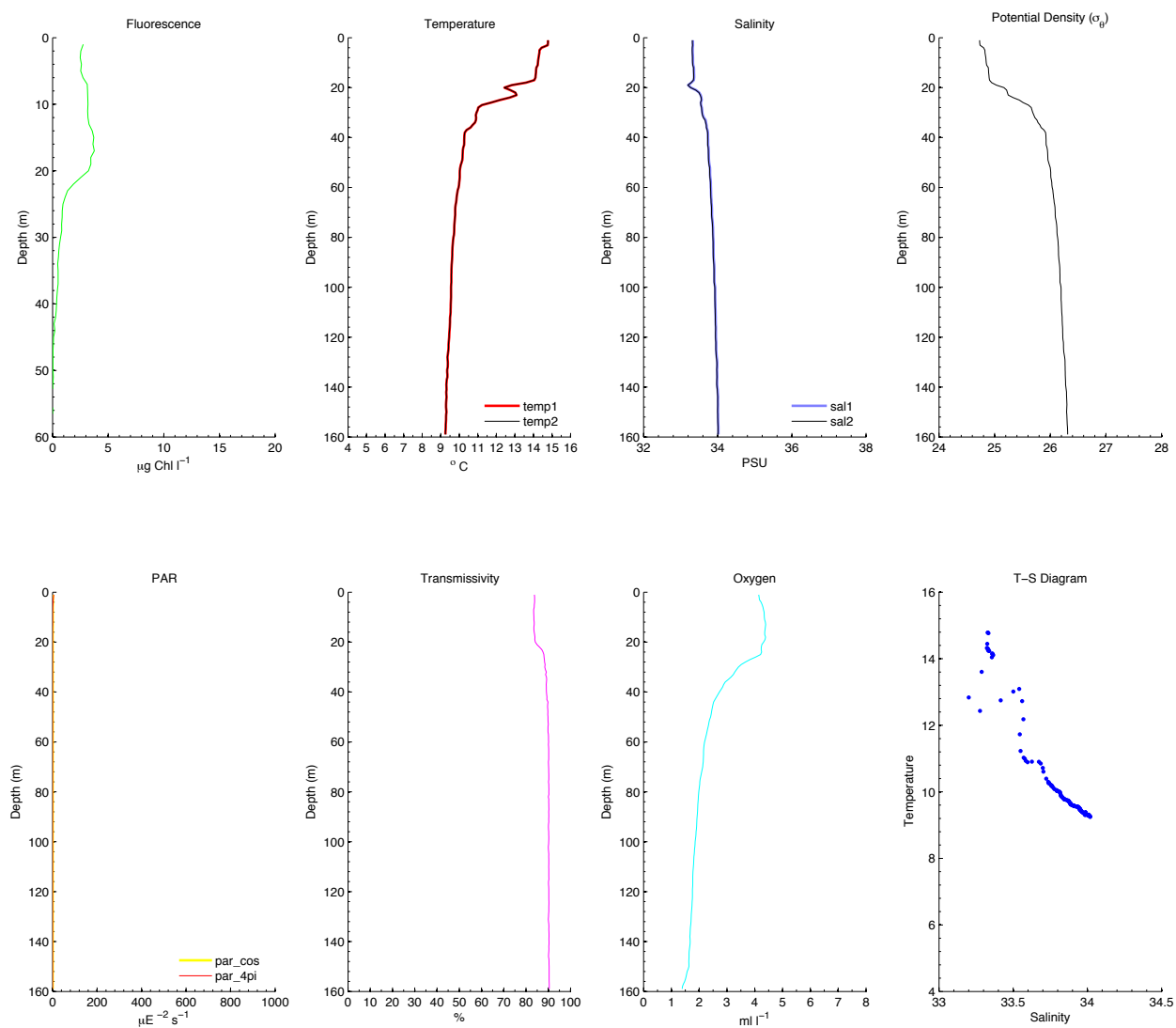


PHILLS Caption: Marine layer had an opening at the start of the flight that was large enough for us to fly along the nrl 19 to nrl 20 station line. We did this at the start of the flight and then reversed our direction to refly the line toward shore. We passed over the NRL charted ship Point Sur out near the end of the line at station 20. The ship was steaming in toward shore at the time of the overflight. When we got back to shore the marine cloud layer was moving in fast. We did some closely spaced overlapping lines over red blumes near MBARI and in the North part of the Bay (North Bay) surveyed on 11 October. Stage set at $P = +30$ degrees, scanning from -1.8 to $+1.8$ degrees at a rate of 0.9 degrees/second when traveling away from Sun and $P = -30$ degrees, scanning from -1.8 to $+1.8$ degrees at a rate of 0.9 degrees/second when traveling toward Sun.

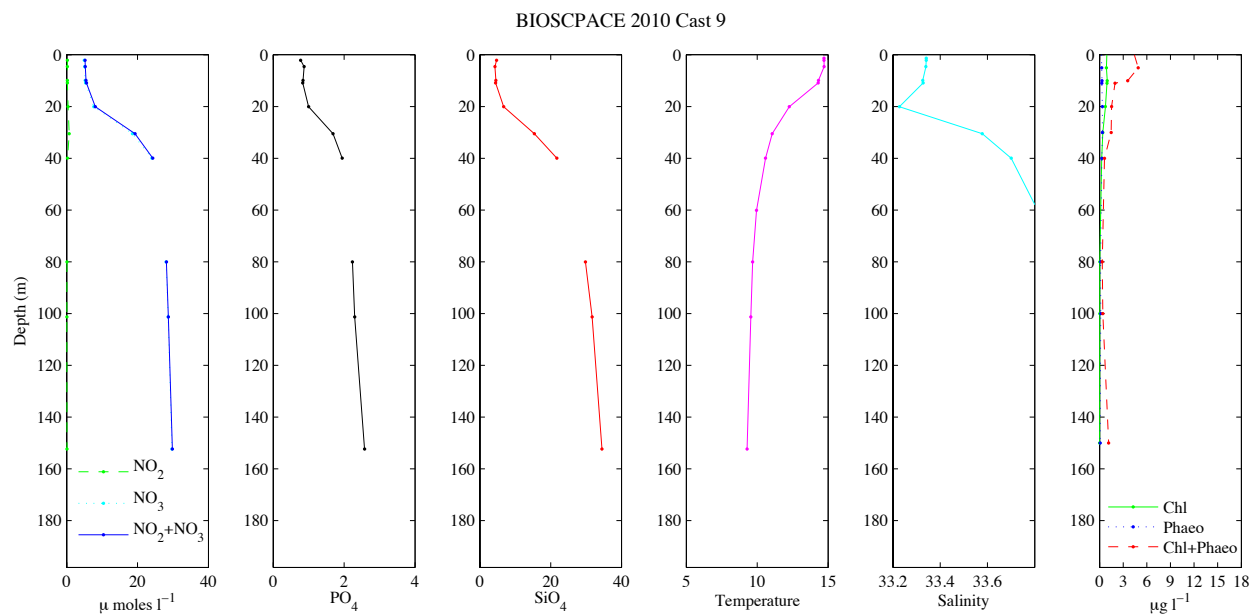
Cast 9 (0723 PDT; [Scanfish Calibration](#))
(Clear, sunrise)

CTD

BIOSPACE 2010 Cast 9 (SCAN CAL.; 2010-10-14 14:05:00.000 UTC) CTD Downcast Data (Calibrated)

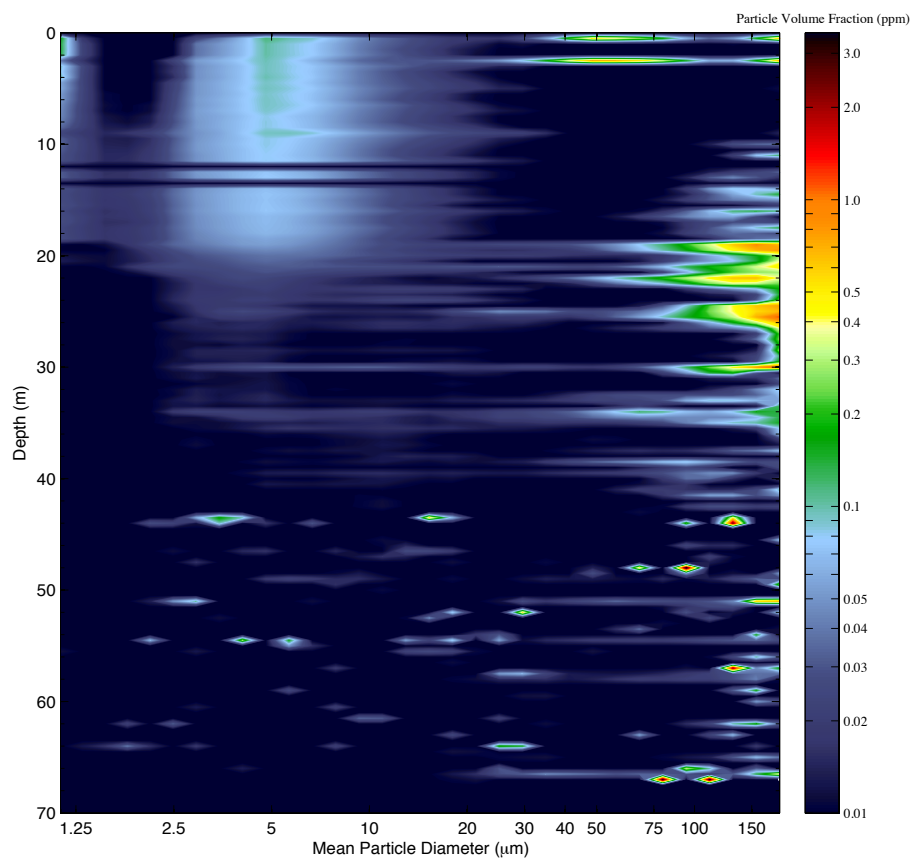


Bottle Nutrients and Chlorophyll

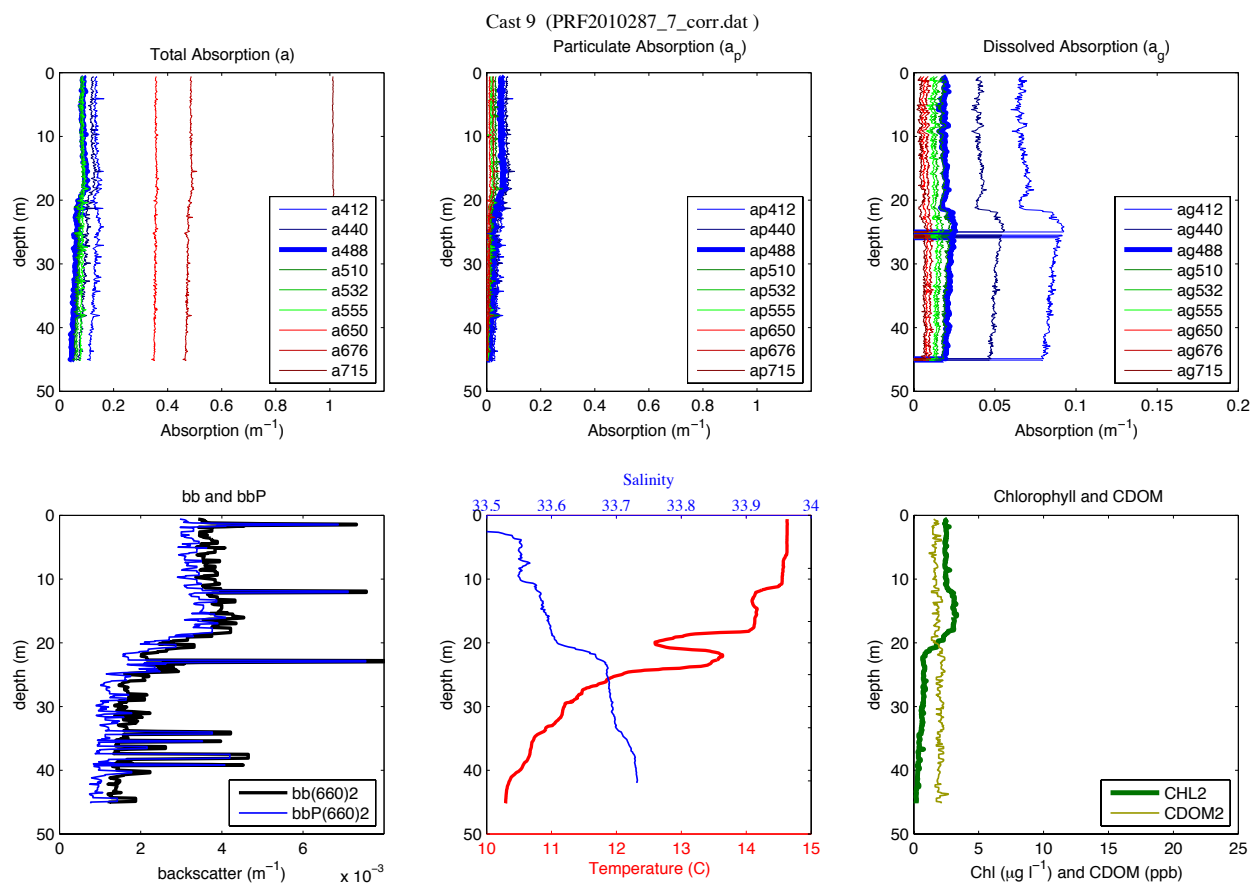


LISST

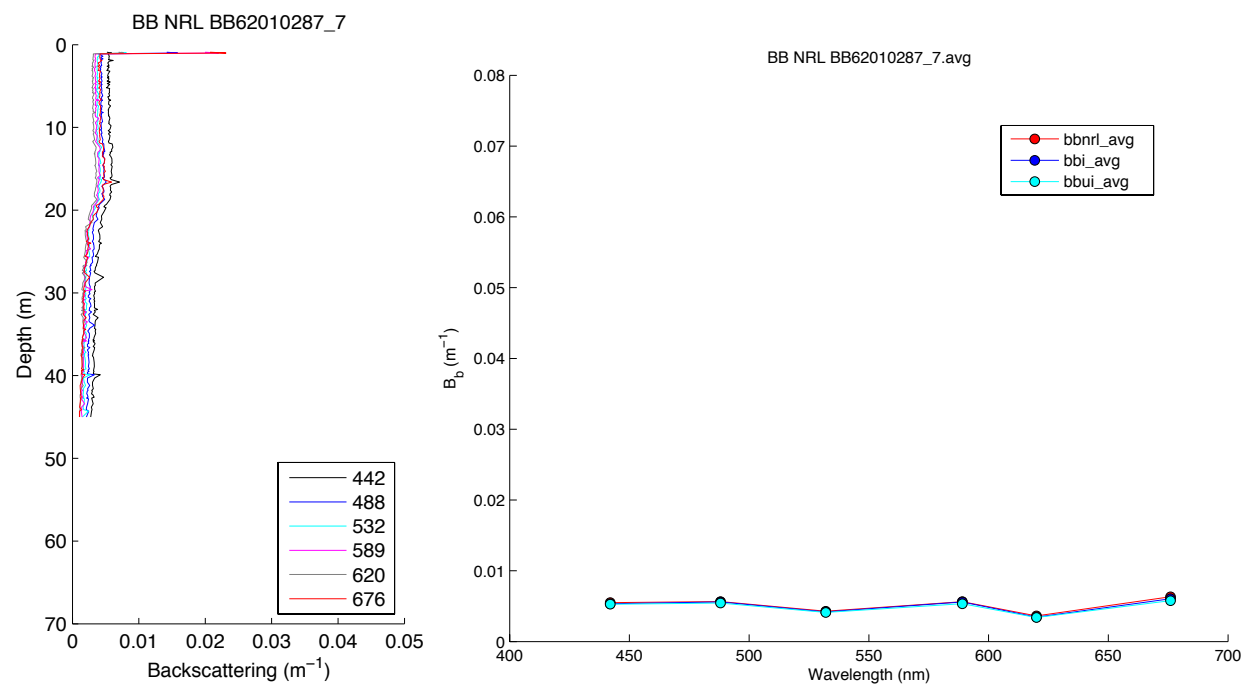
LISST – Cast 09



Optics Profile Package

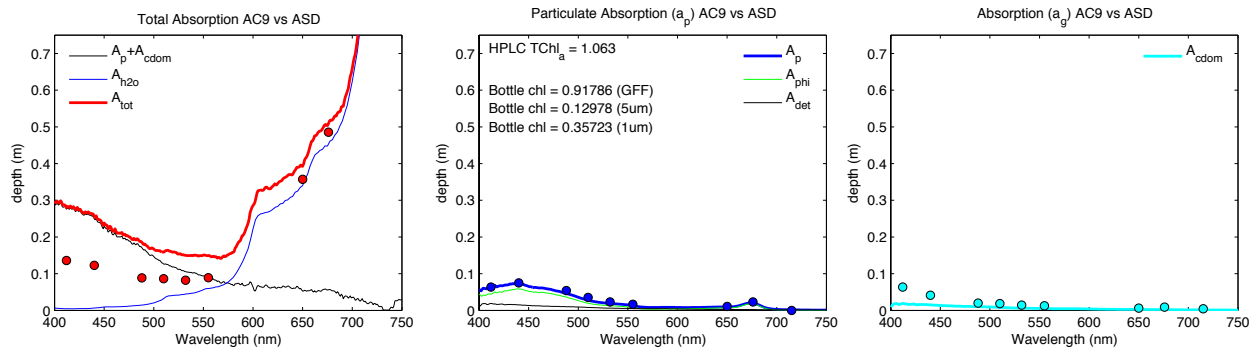


HydroScat

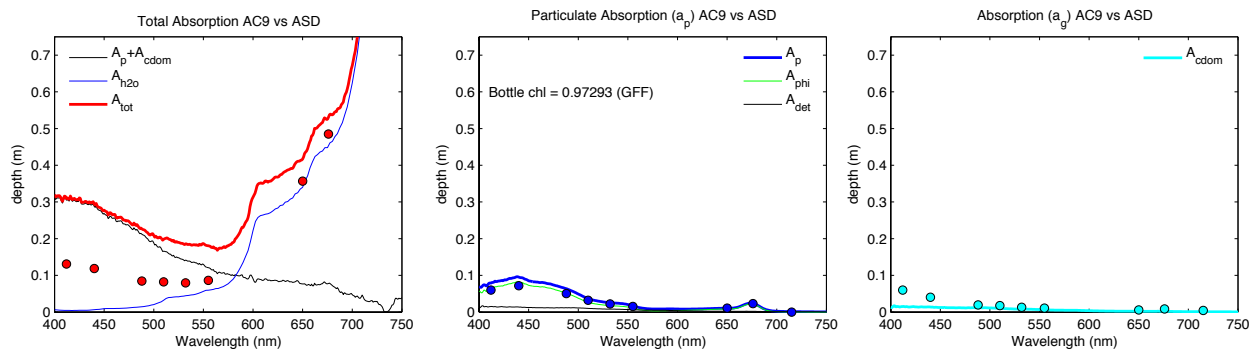


Filter Pad Absorption (w/ AC9)

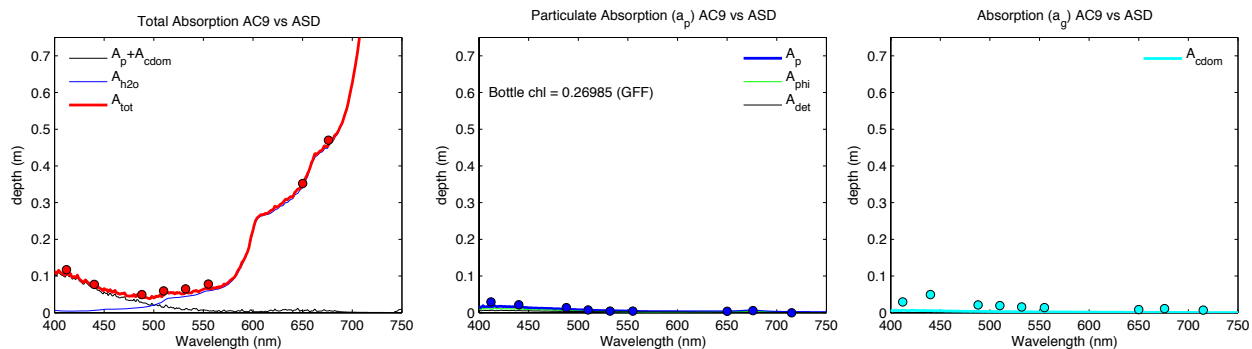
AC9 vs ASD Cast 9 – 0m (PRF2010287_7_corr.dat) NRL s4



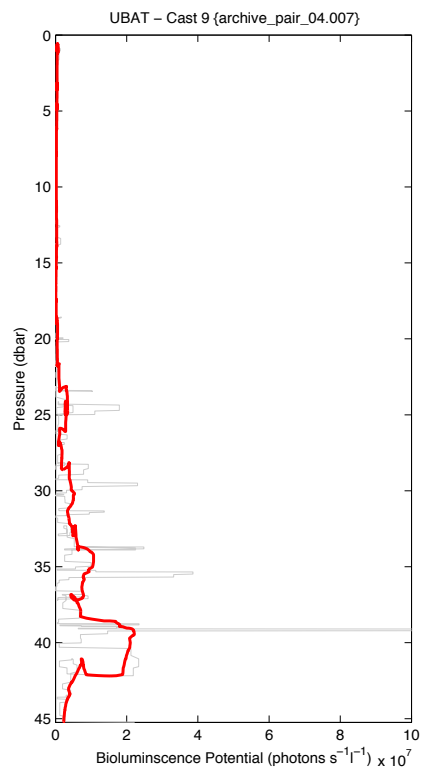
AC9 vs ASD Cast 9 – 10m (PRF2010287_7_corr.dat) NRL s4



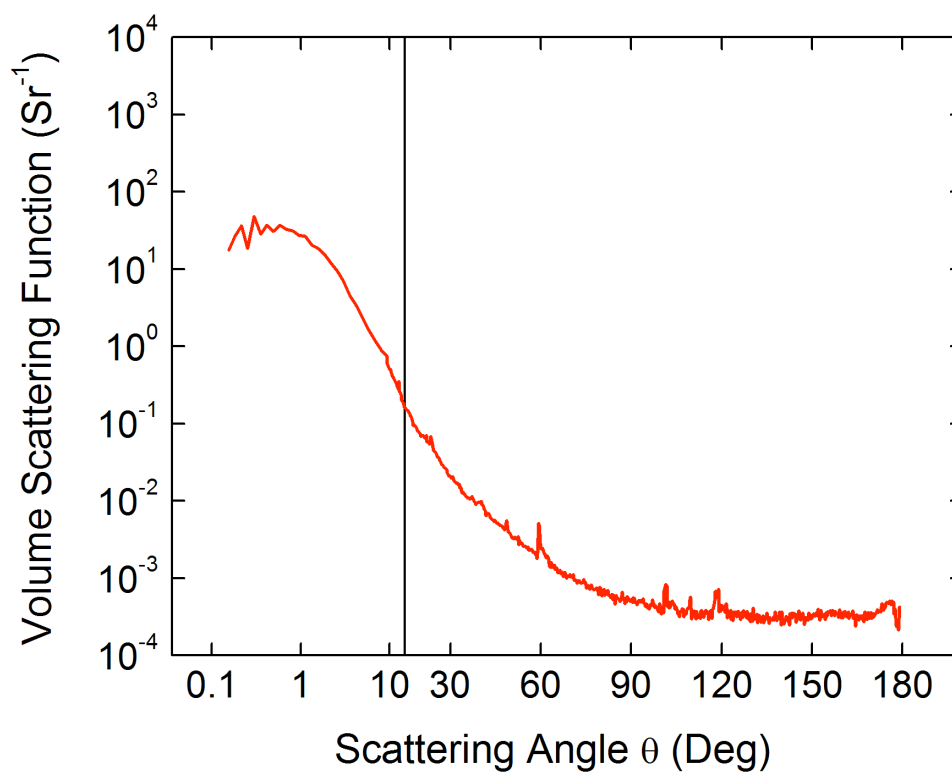
AC9 vs ASD Cast 9 – 40m (PRF2010287_7_corr.dat) NRL s4



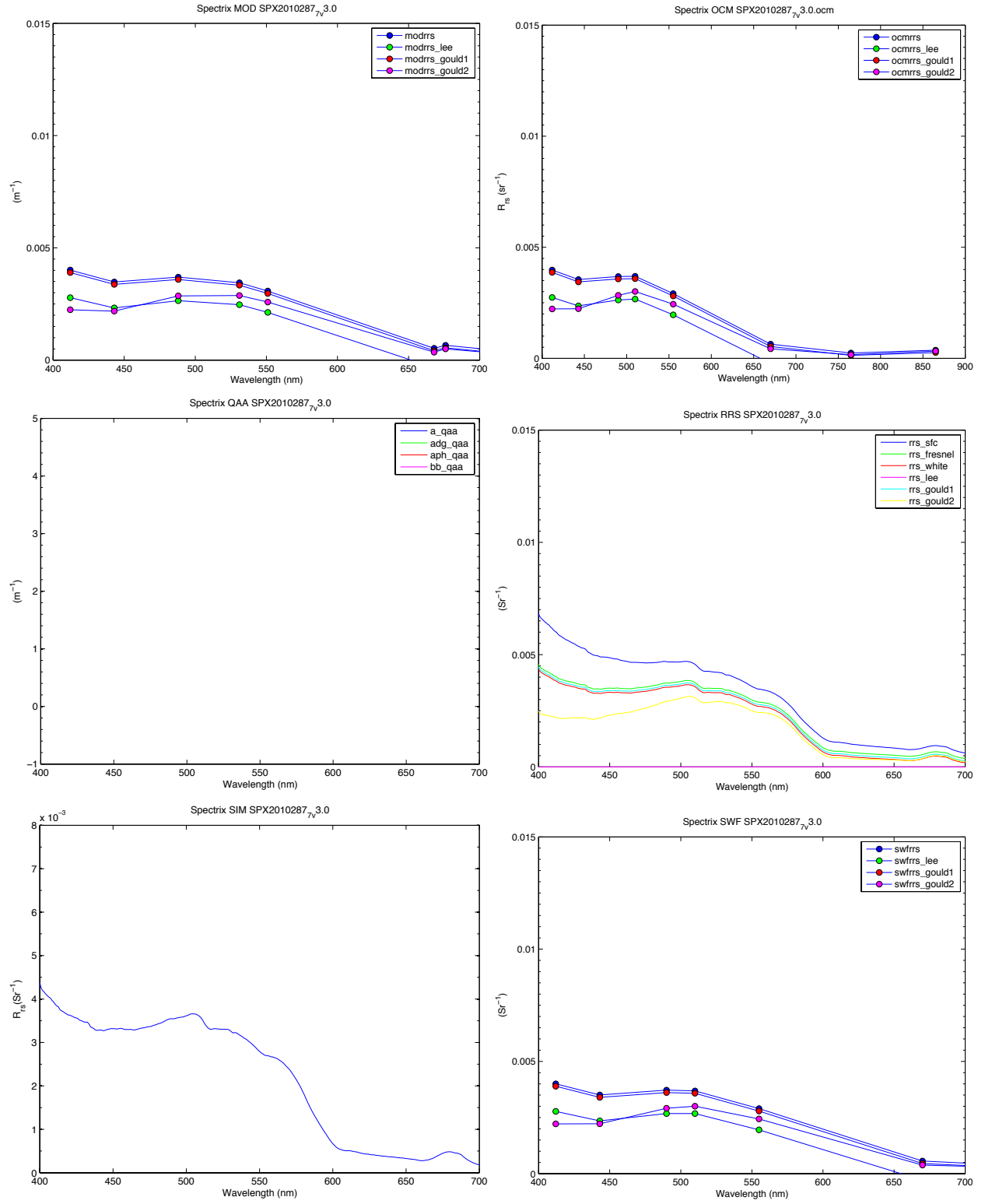
UBAT



MVSC (532 nm)



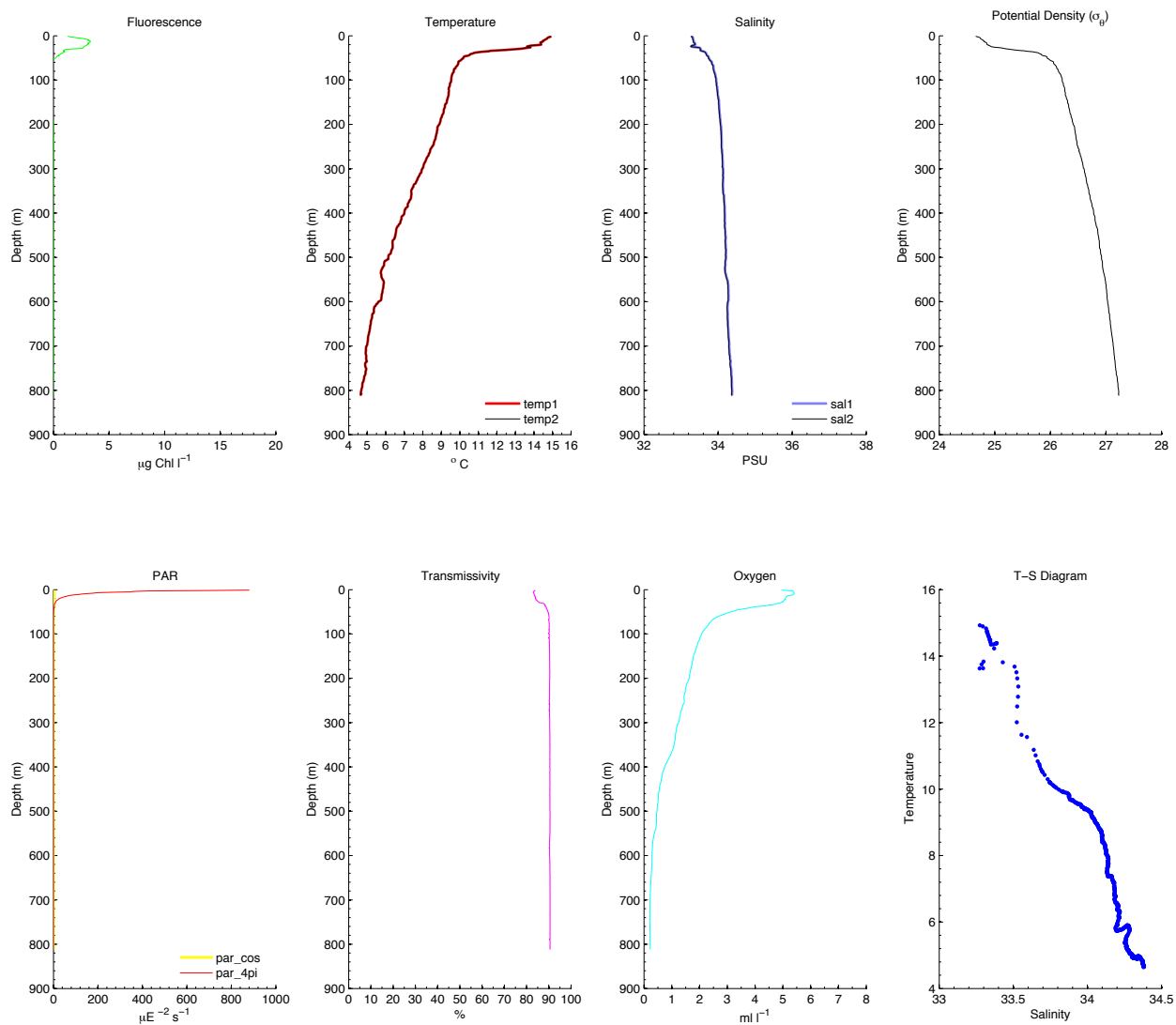
SPECTRIX



Cast 10 (0900 PDT; [Station BS23](#))
(clear, some haze)

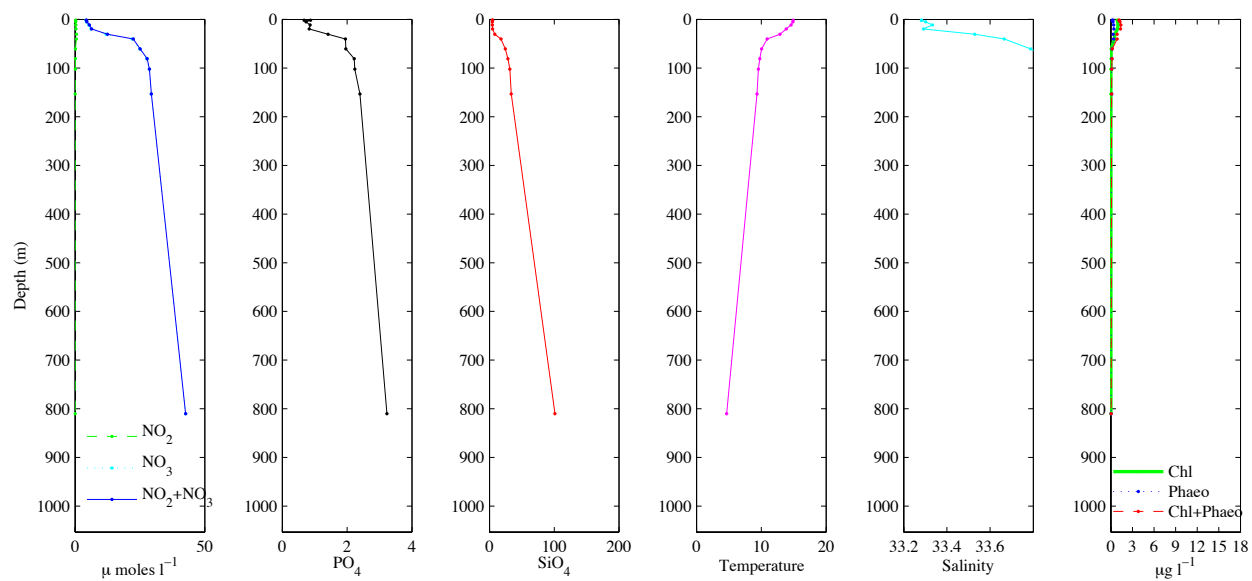
CTD

BIOSPACE 2010 Cast 10 (CTD23; 2010-10-14 16:05:00.000 UTC) CTD Downcast Data (Calibrated)



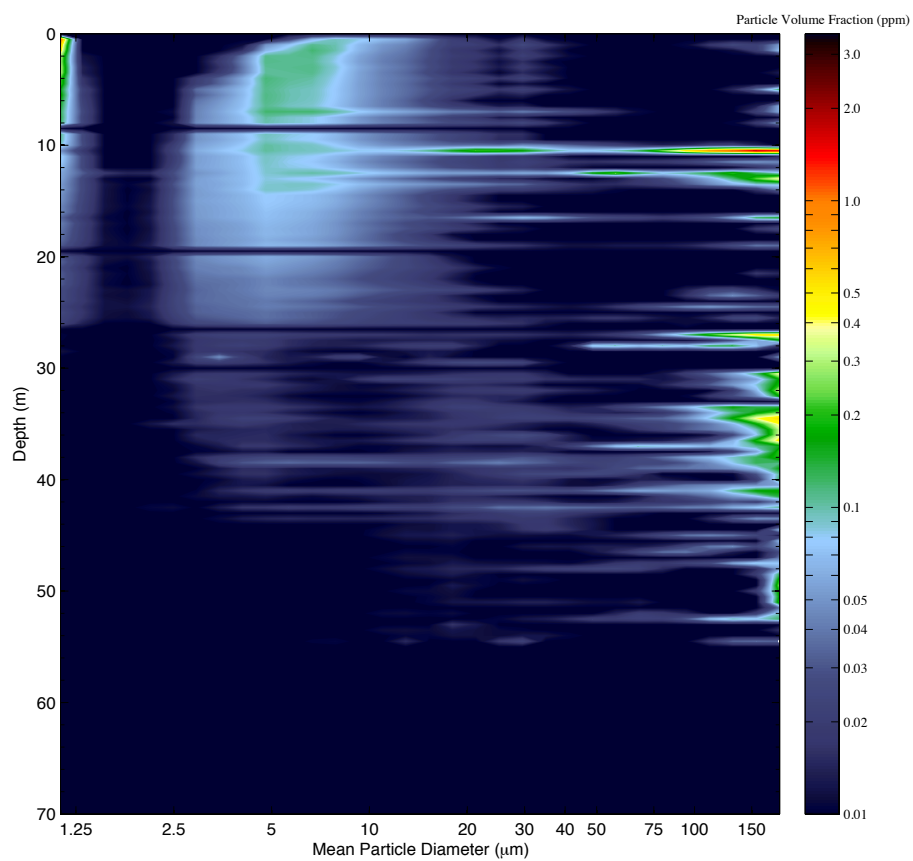
Bottle Nutrients and Chlorophyll

BIOSPACE 2010 Cast 10

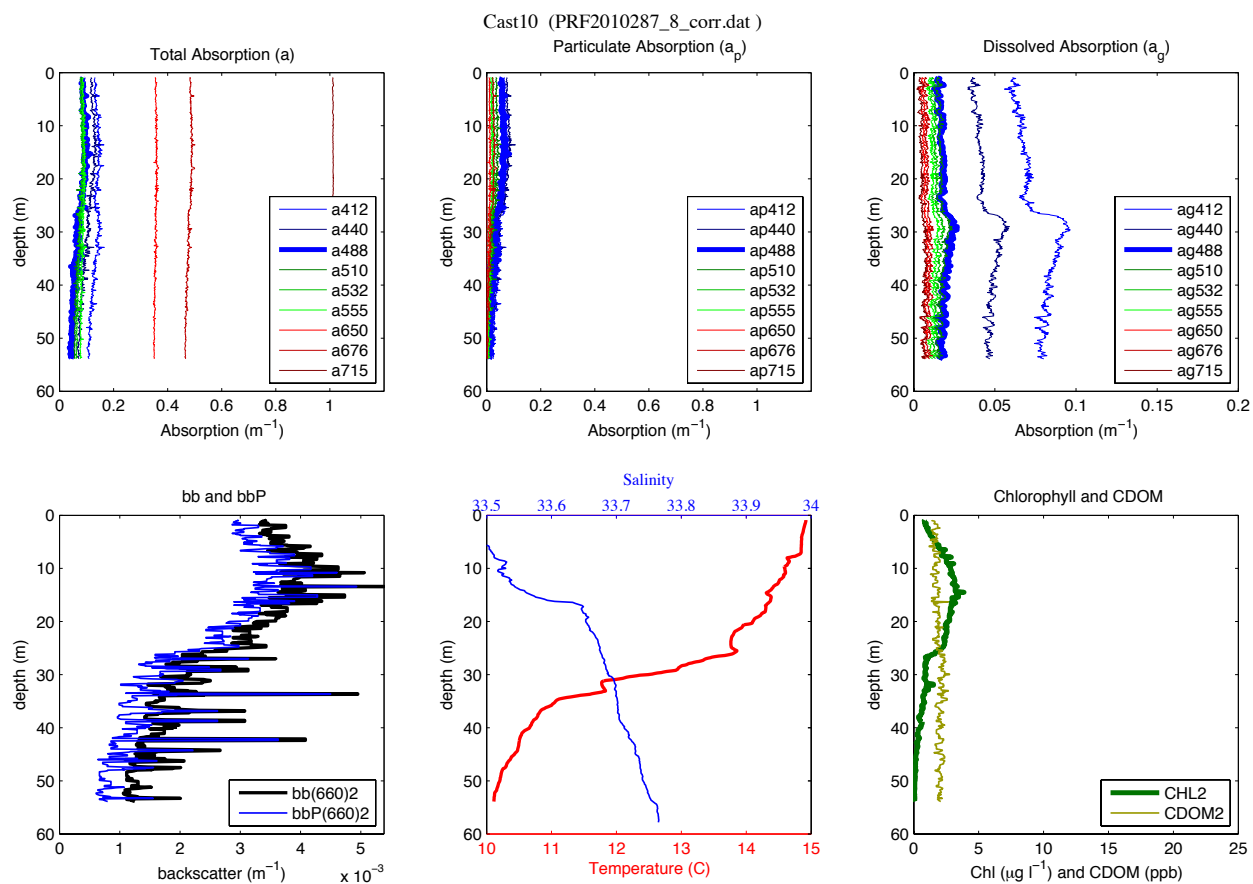


LISST

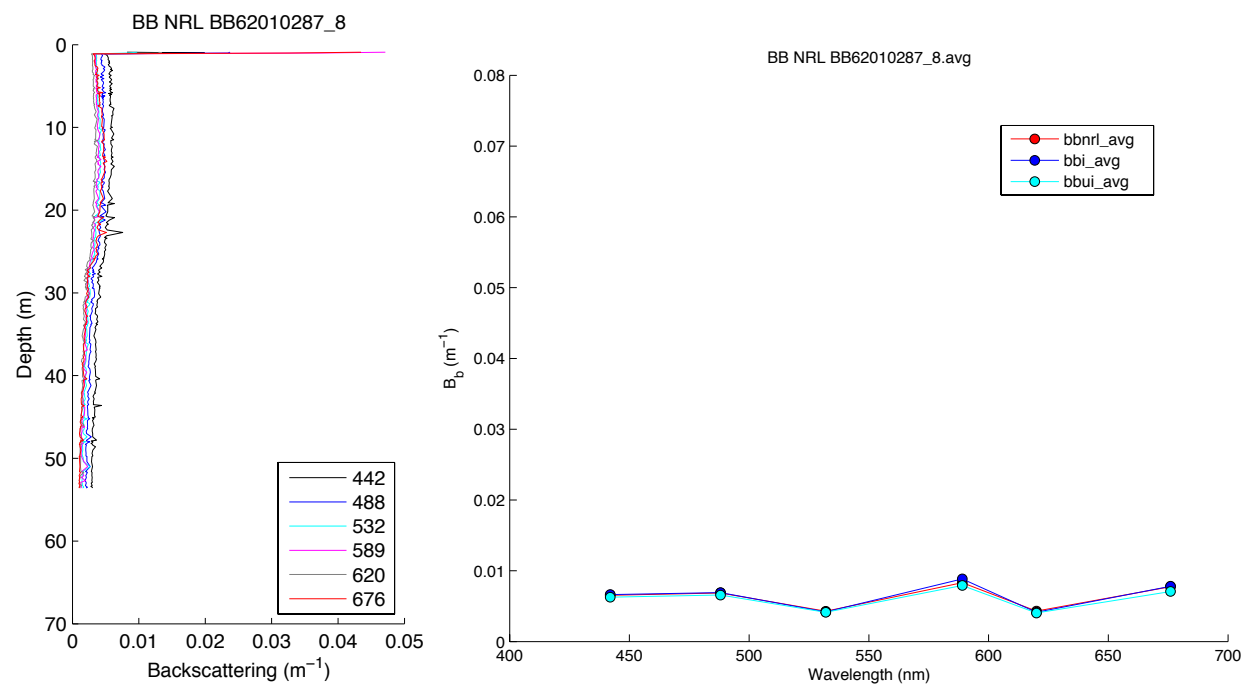
LISST – Cast 10



Optics Profile Package

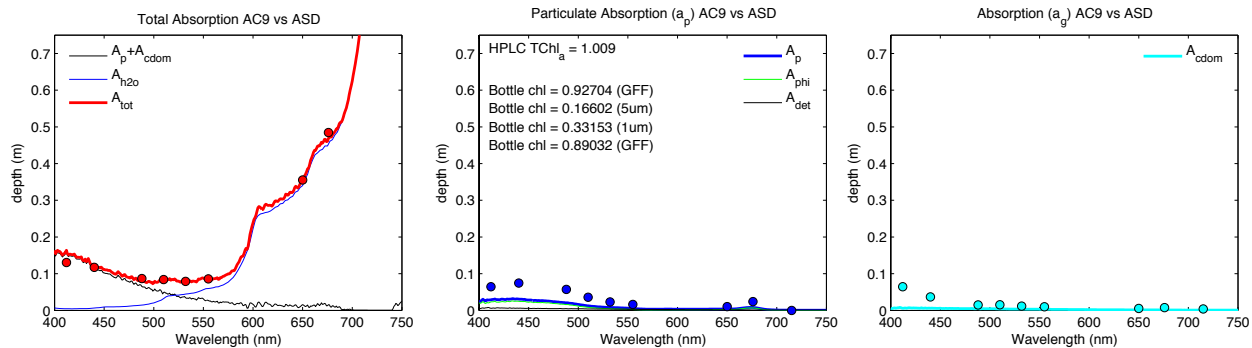


HydroScat

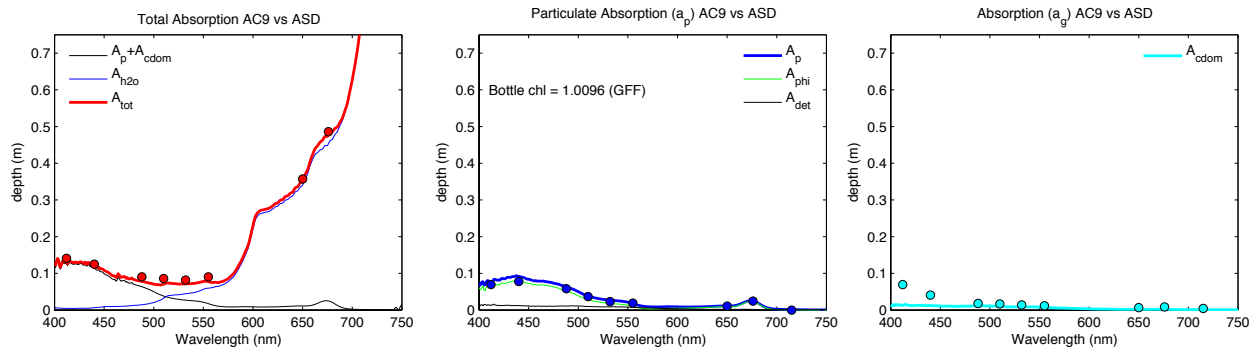


Filter Pad Absorption (w/ AC9)

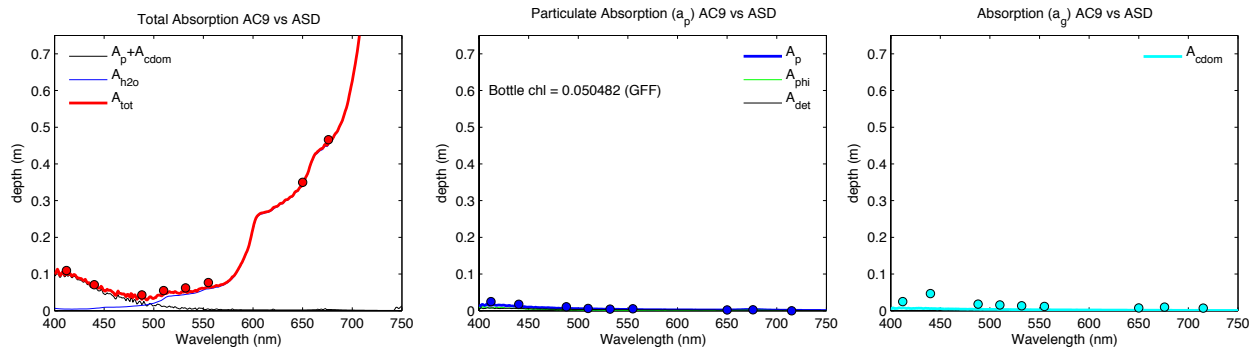
AC9 vs ASD Cast 10 – 0m (PRF2010287_8_corr.dat) scanfish pre-calibration



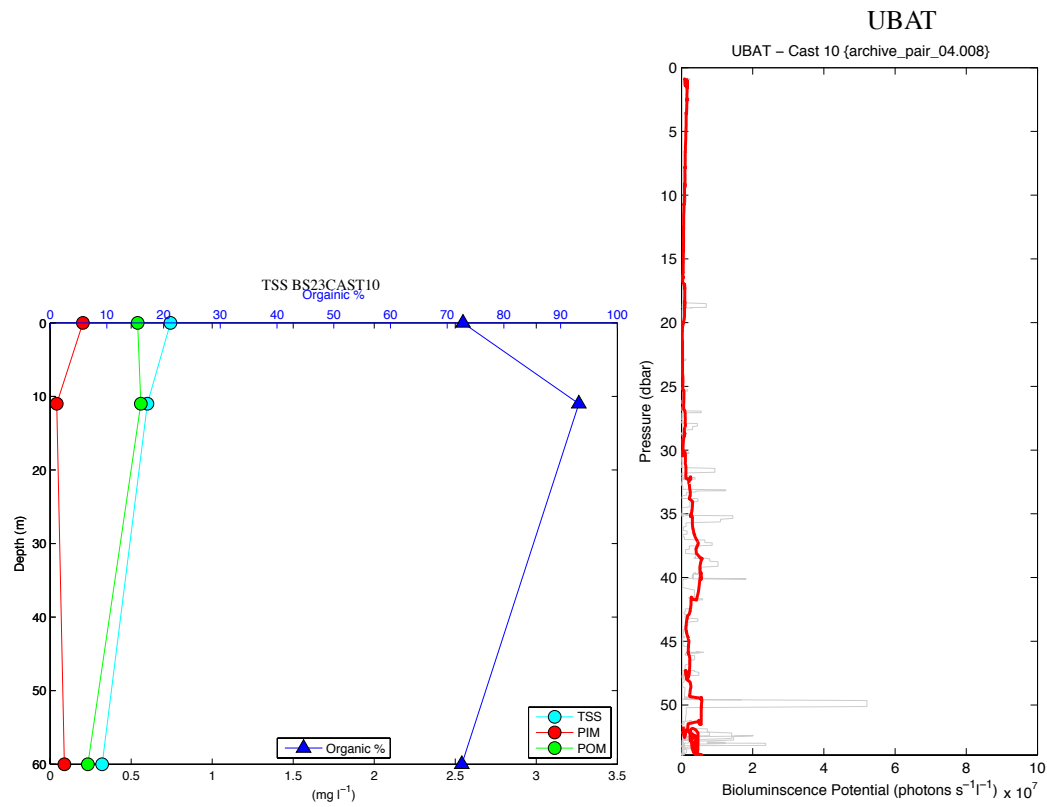
AC9 vs ASD Cast 10 – 11m (PRF2010287_8_corr.dat) scanfish pre-calibration



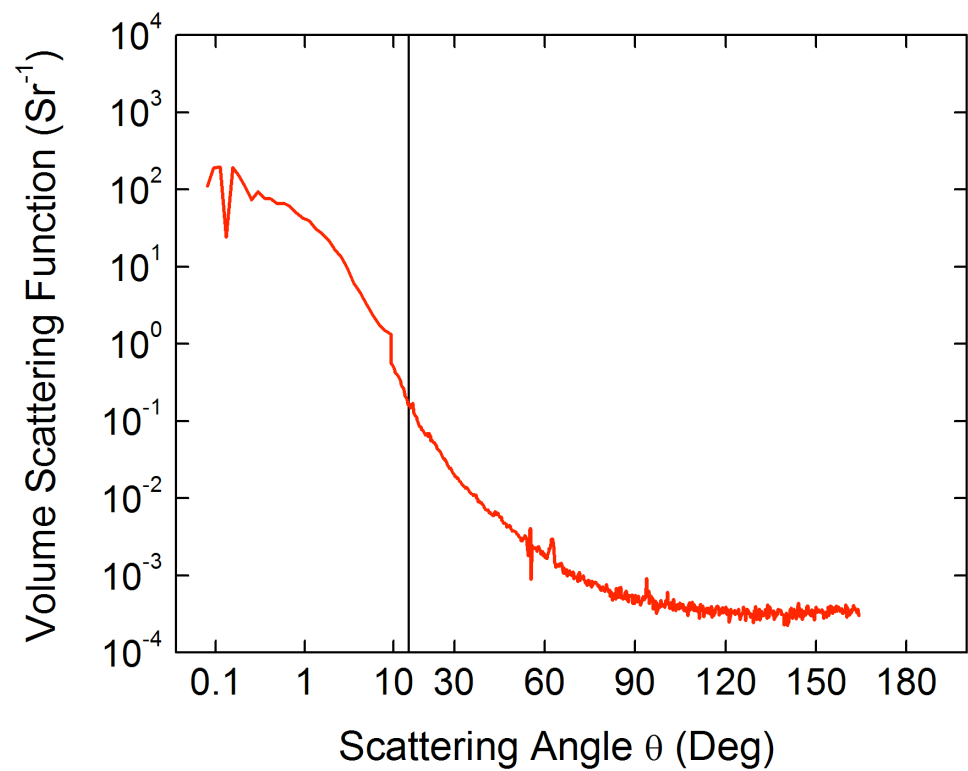
AC9 vs ASD Cast 10 – 60m (PRF2010287_8_corr.dat) scanfish pre-calibration



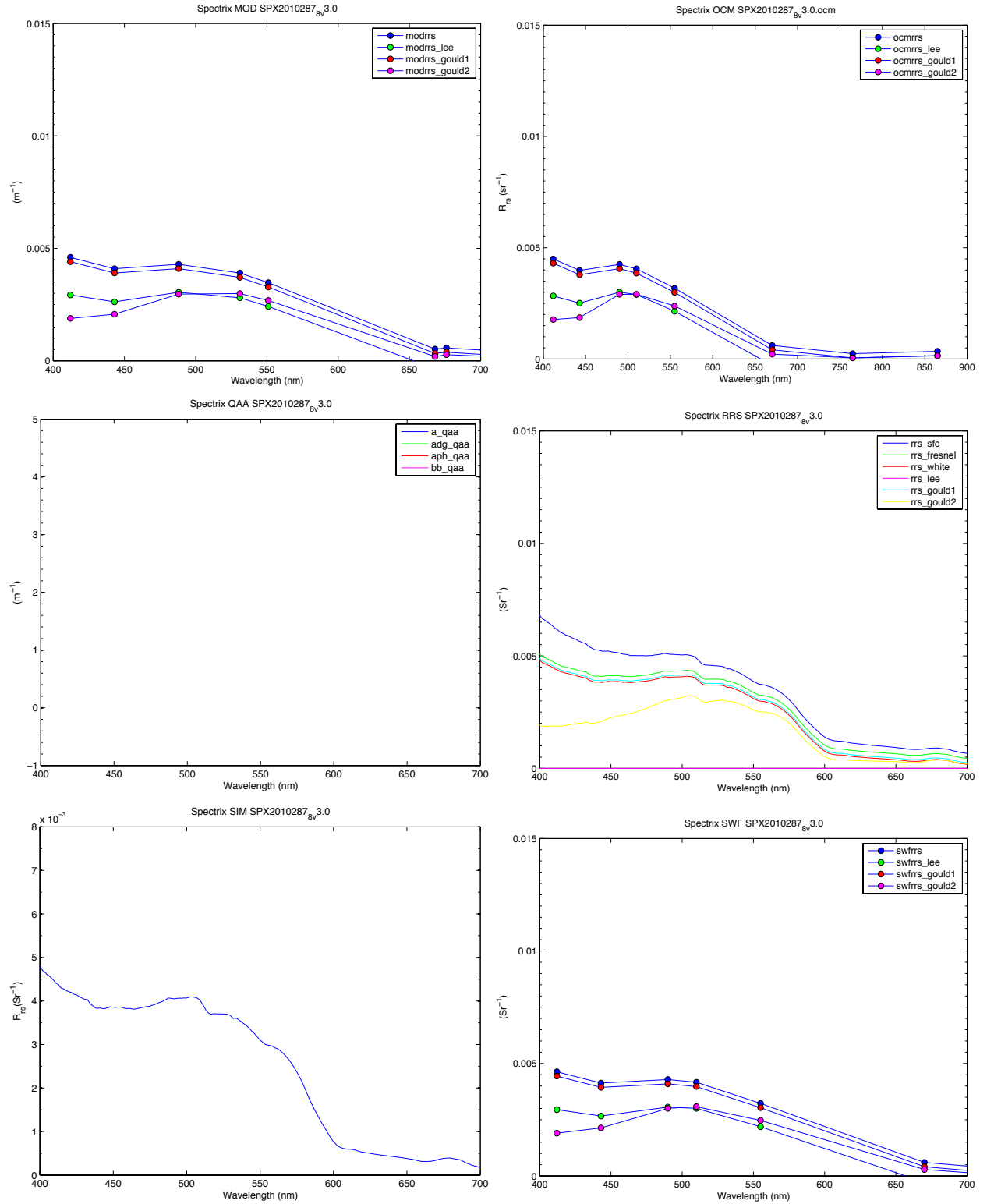
TSS



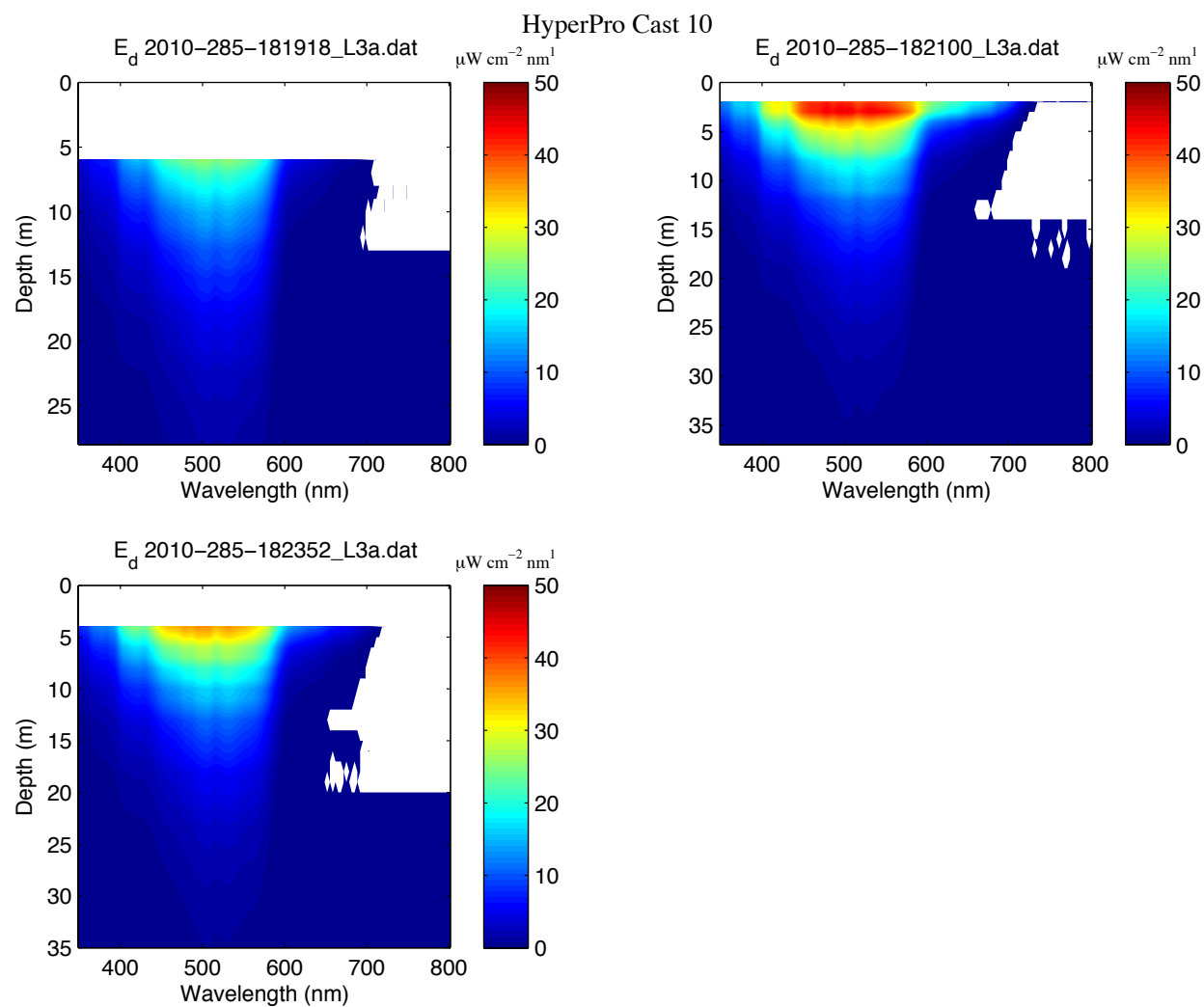
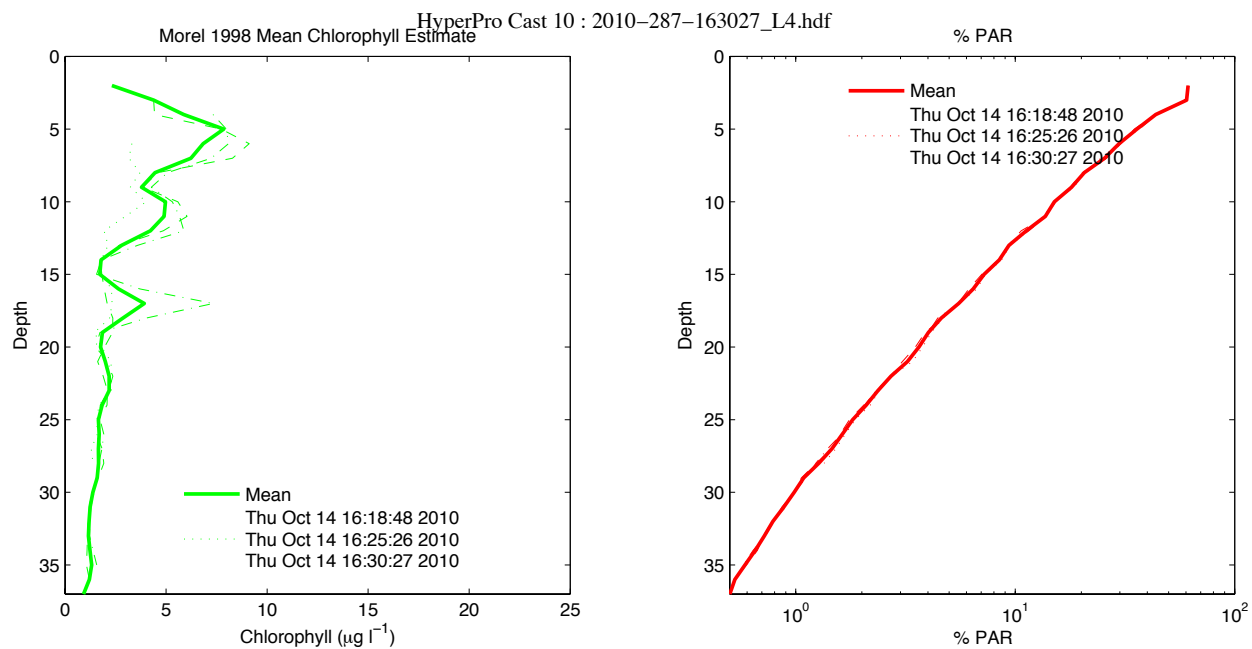
MVSC (532 nm)



SPECTRIX



HyperPro

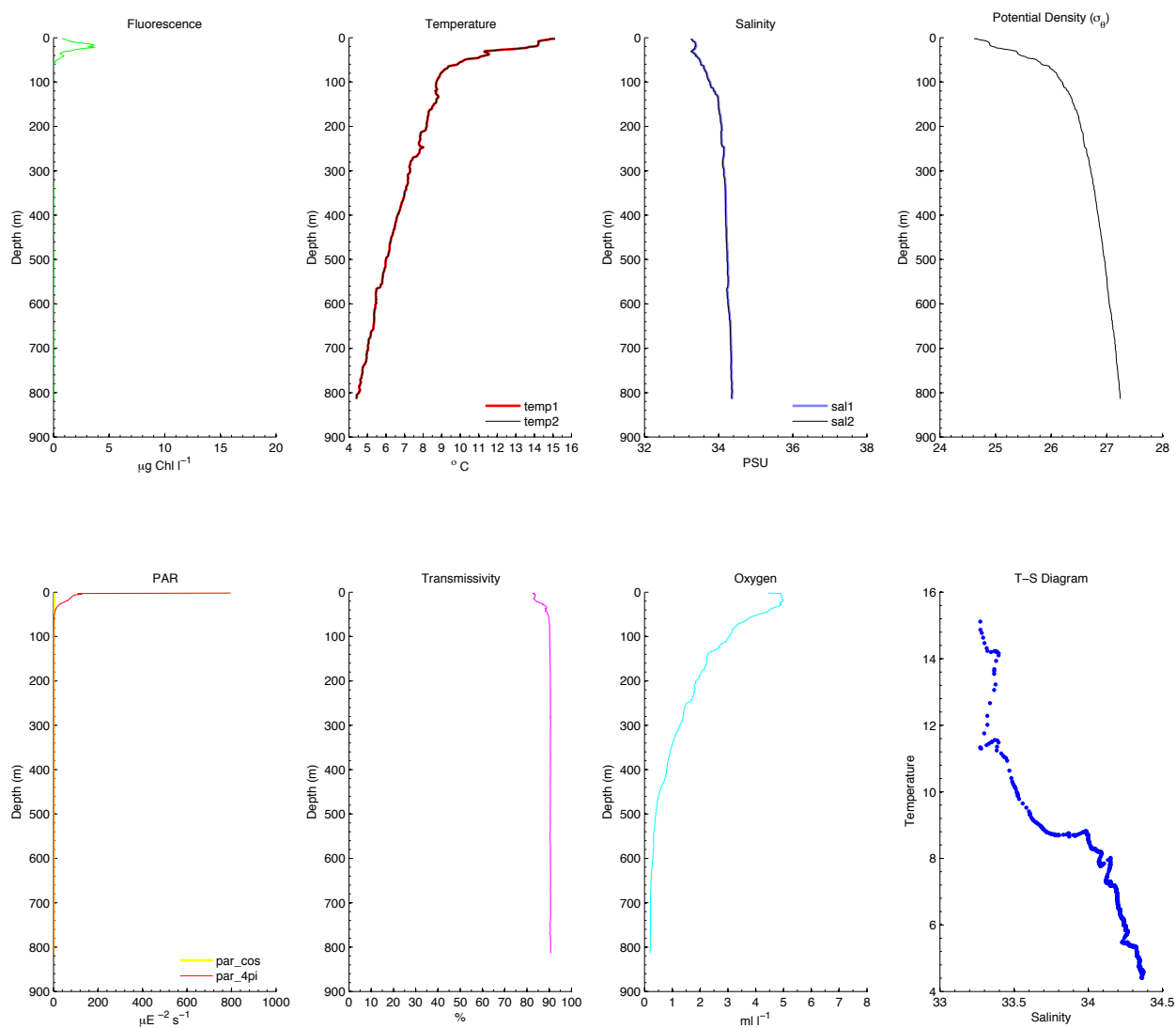


Cast 11 (1217 PDT; [Station BS22](#))

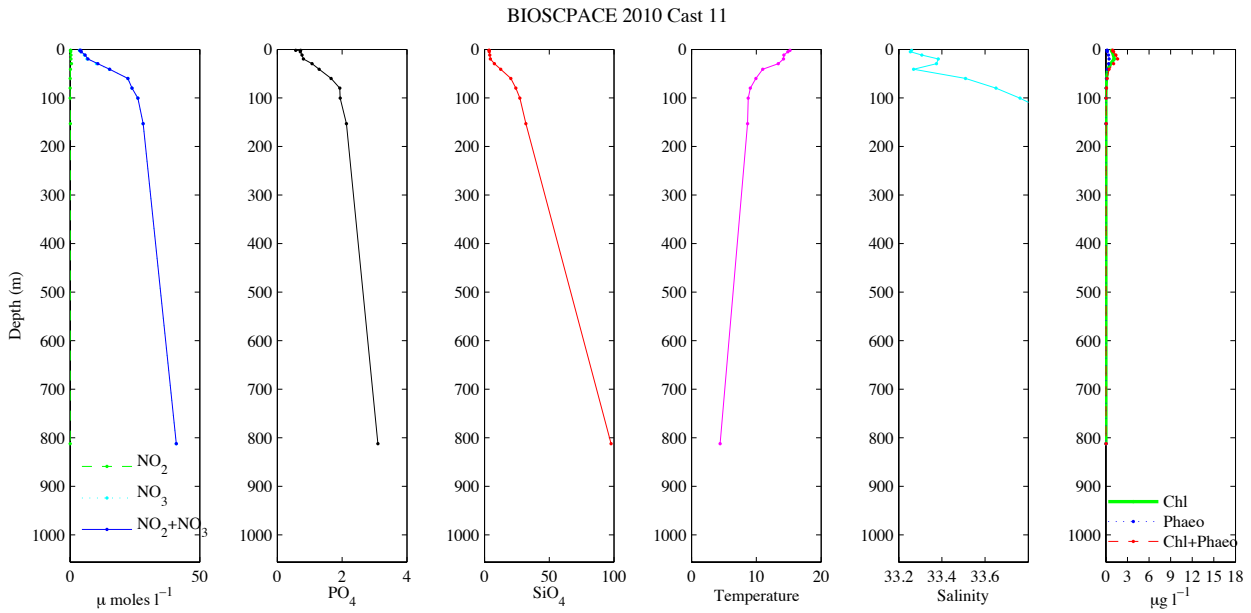
(Problem with optics package short circuited pump cable) (clear, some haze)

CTD

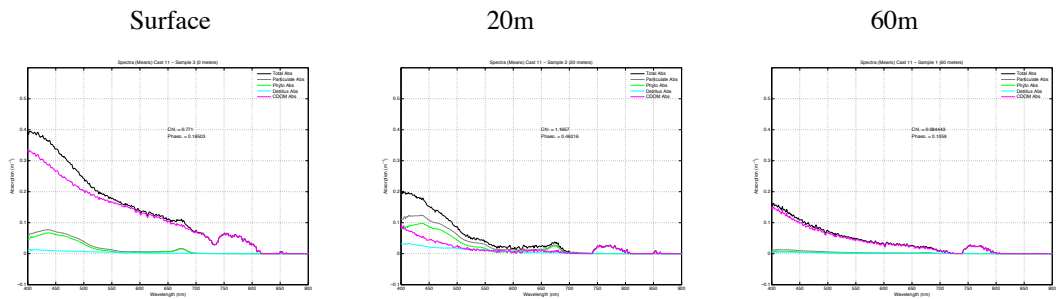
BIOSPACE 2010 Cast 11 (CTD22; 2010-10-14 19:15:00.000 UTC) CTD Downcast Data (Calibrated)



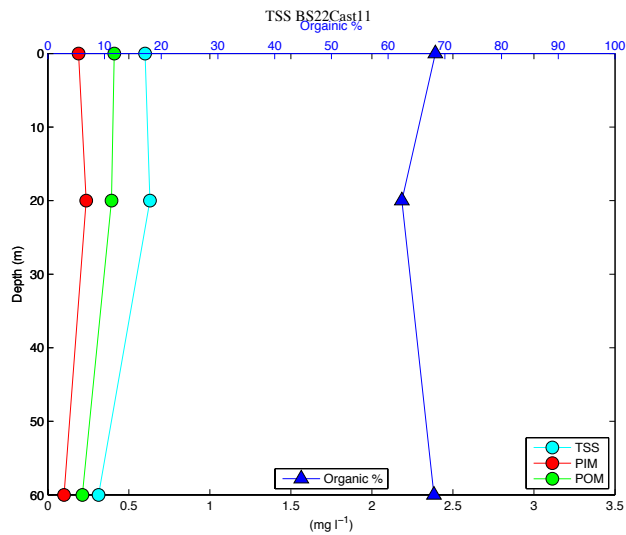
Bottle Nutrients and Chlorophyll



Filter Pad Absorption



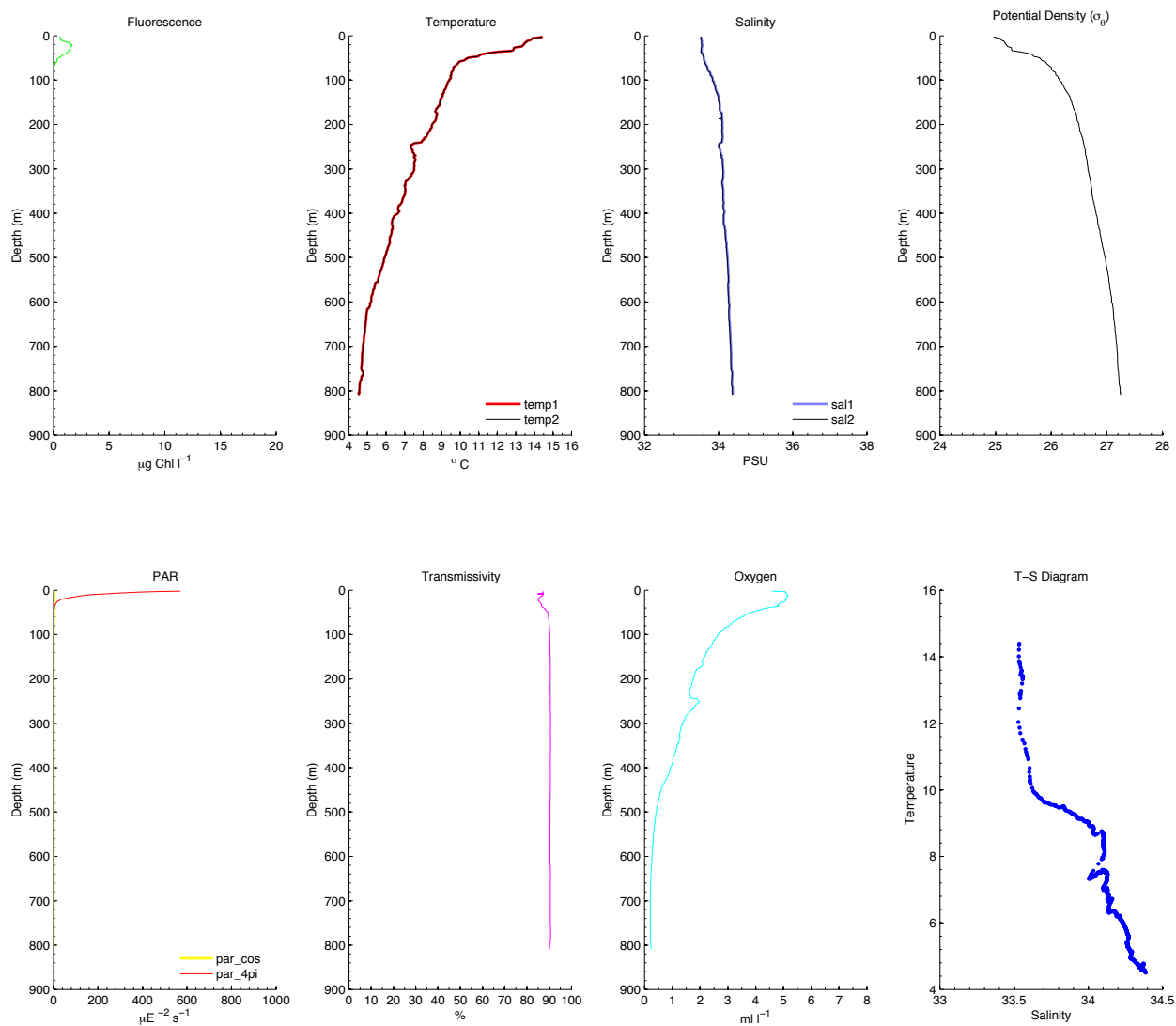
TSS



Cast 12 (1431 PDT; [Station BS21](#))
(foggy)

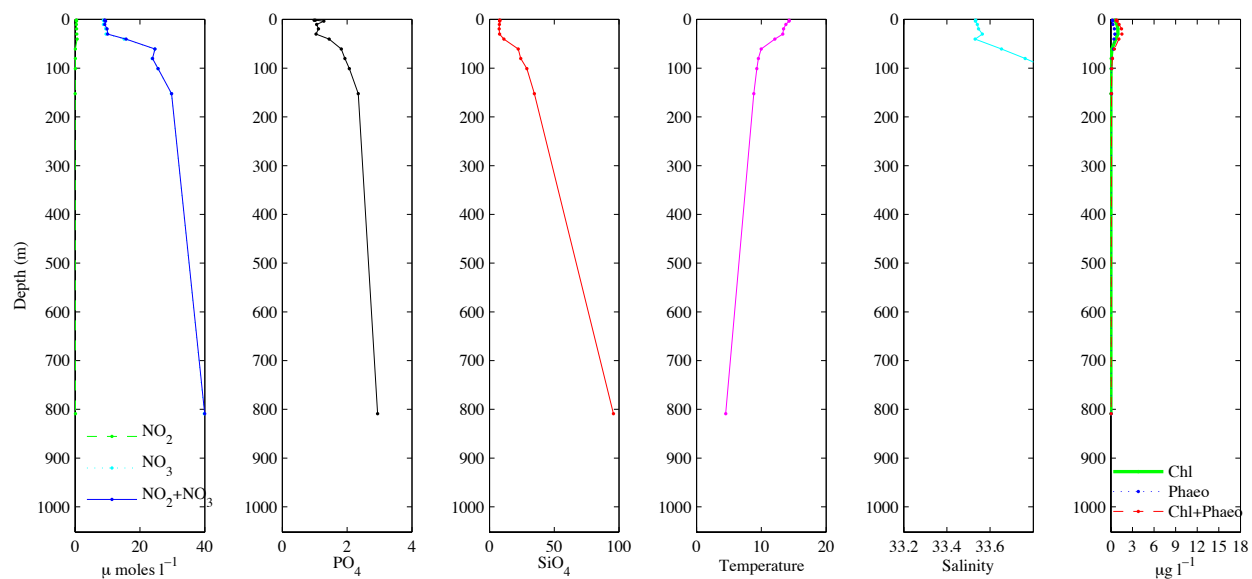
CTD

BIOSPACE 2010 Cast 12 (CTD21; 2010-10-14 21:35:00.000 UTC) CTD Downcast Data (Calibrated)



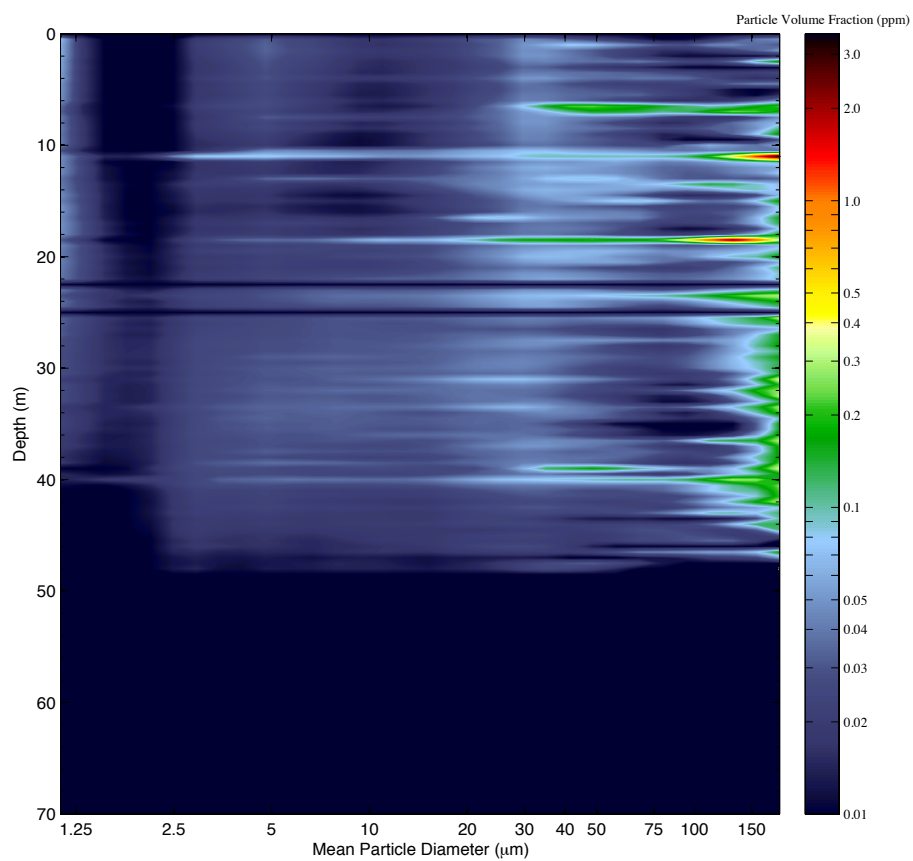
Bottle Nutrients and Chlorophyll

BIOSPACE 2010 Cast 12

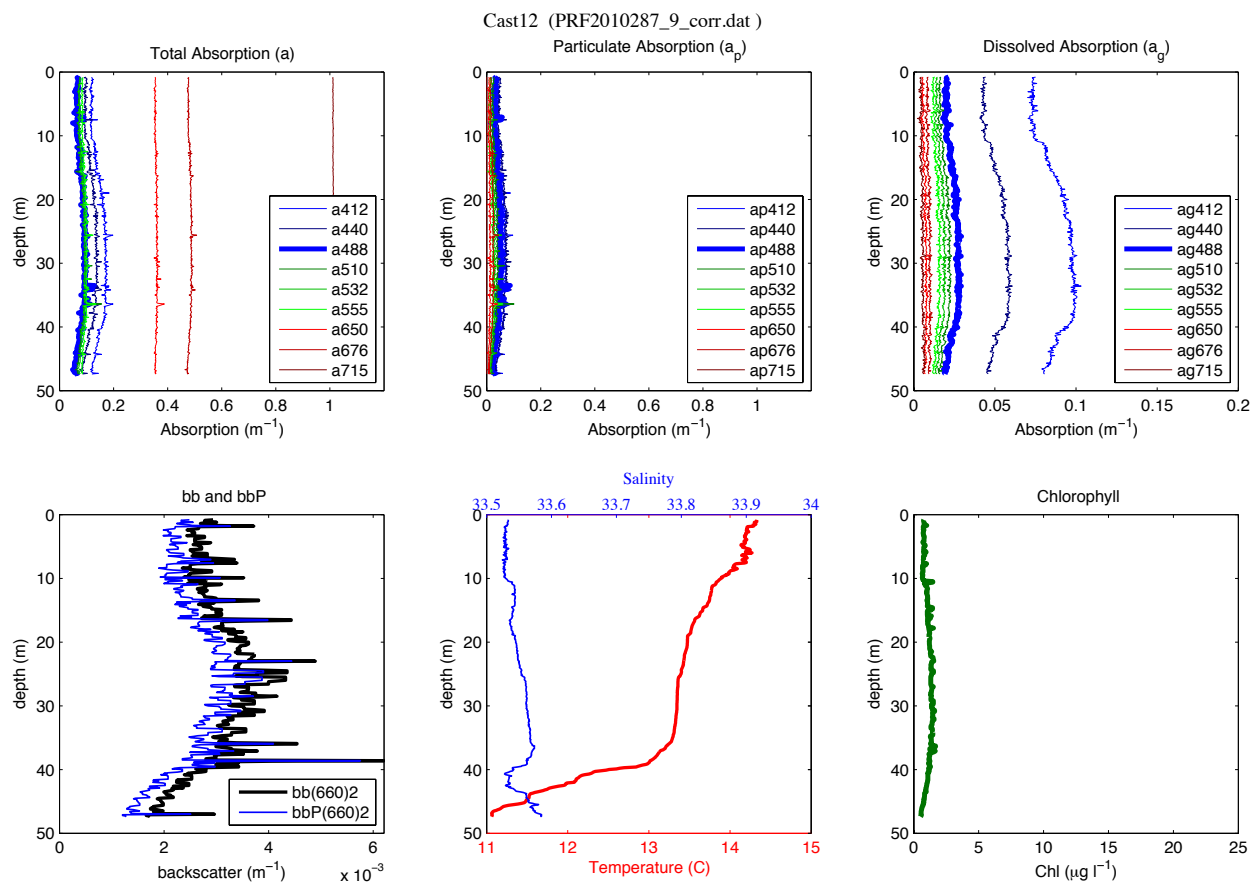


LISST

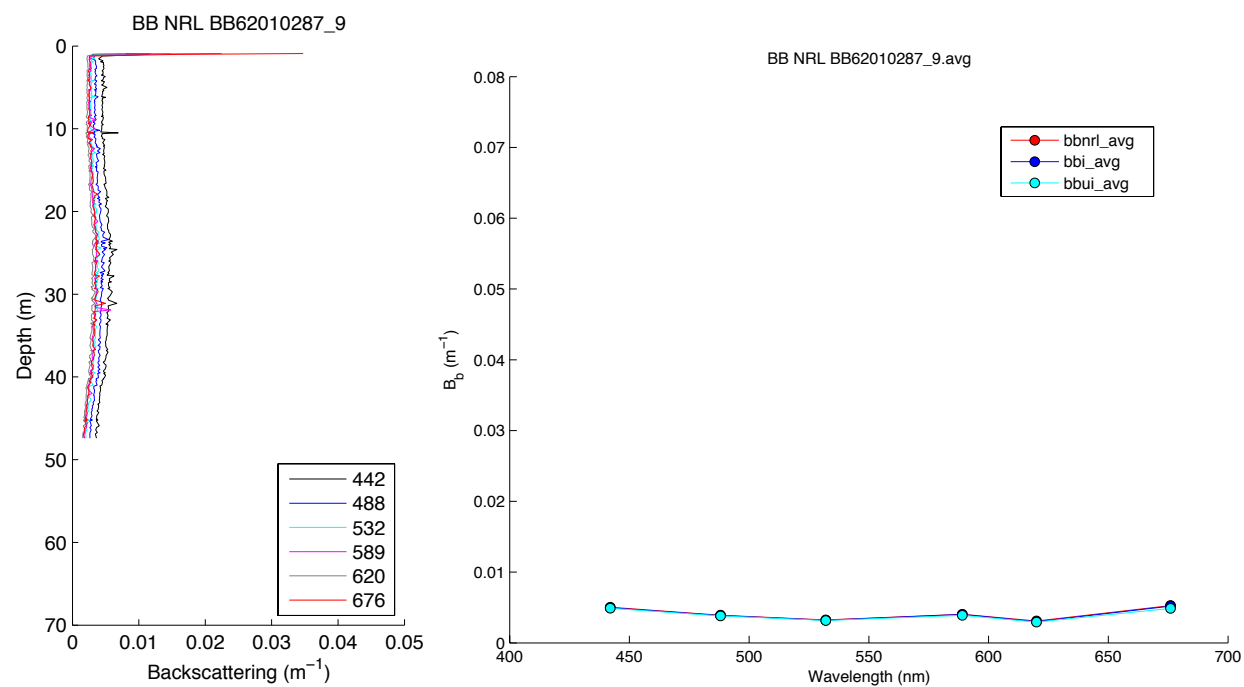
LISST – Cast 12



Optics Profile Package

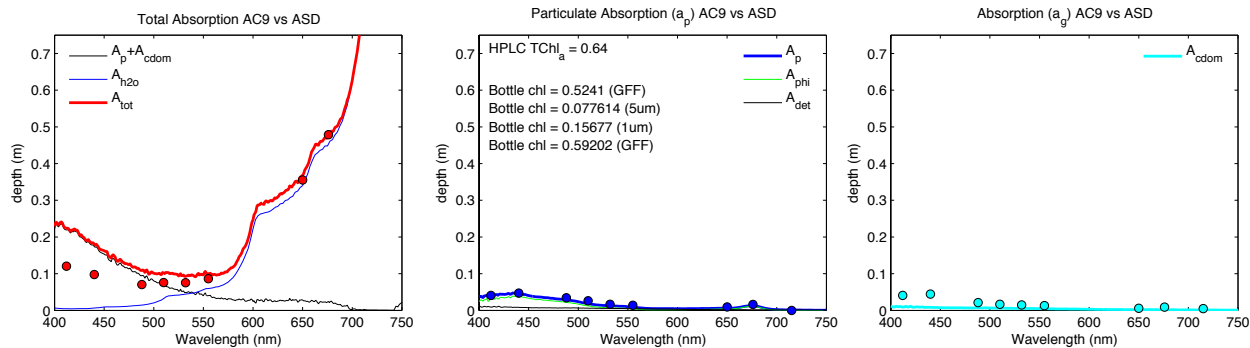


HydroScat

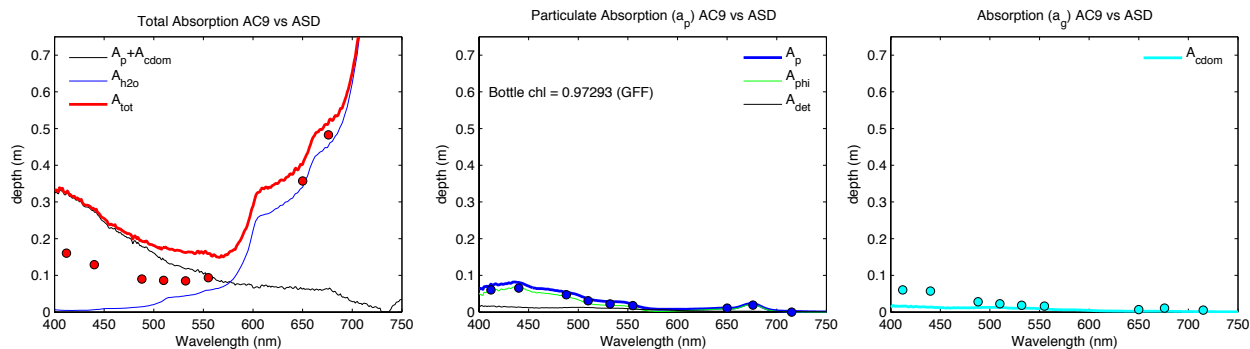


Filter Pad Absorption (w/ AC9)

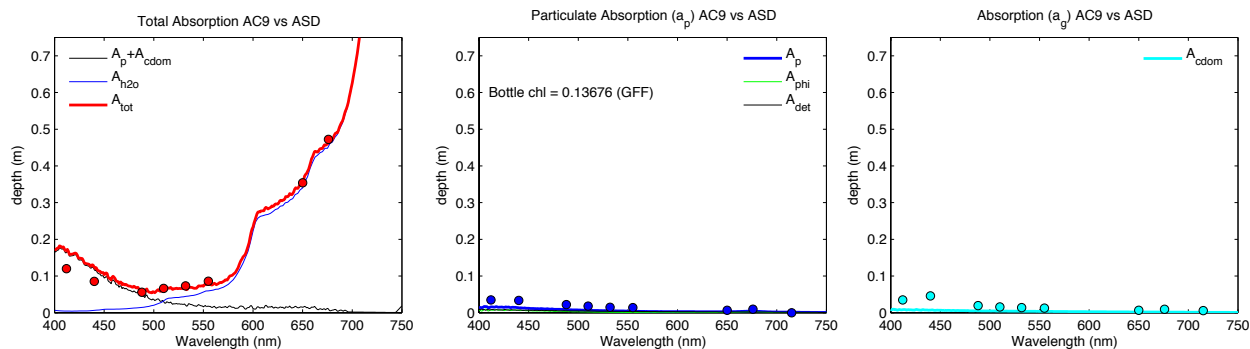
AC9 vs ASD Cast 12 – 0m (PRF2010287_9_corr.dat) CTD 23



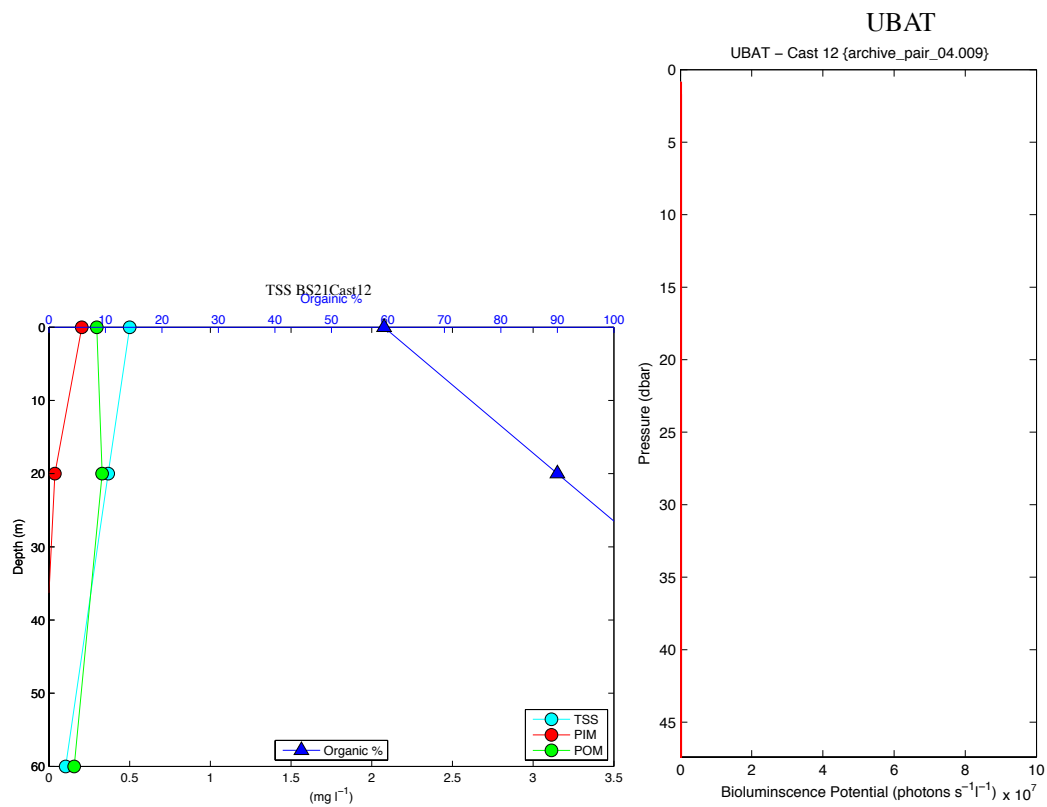
AC9 vs ASD Cast 12 – 20m (PRF2010287_9_corr.dat) CTD 23



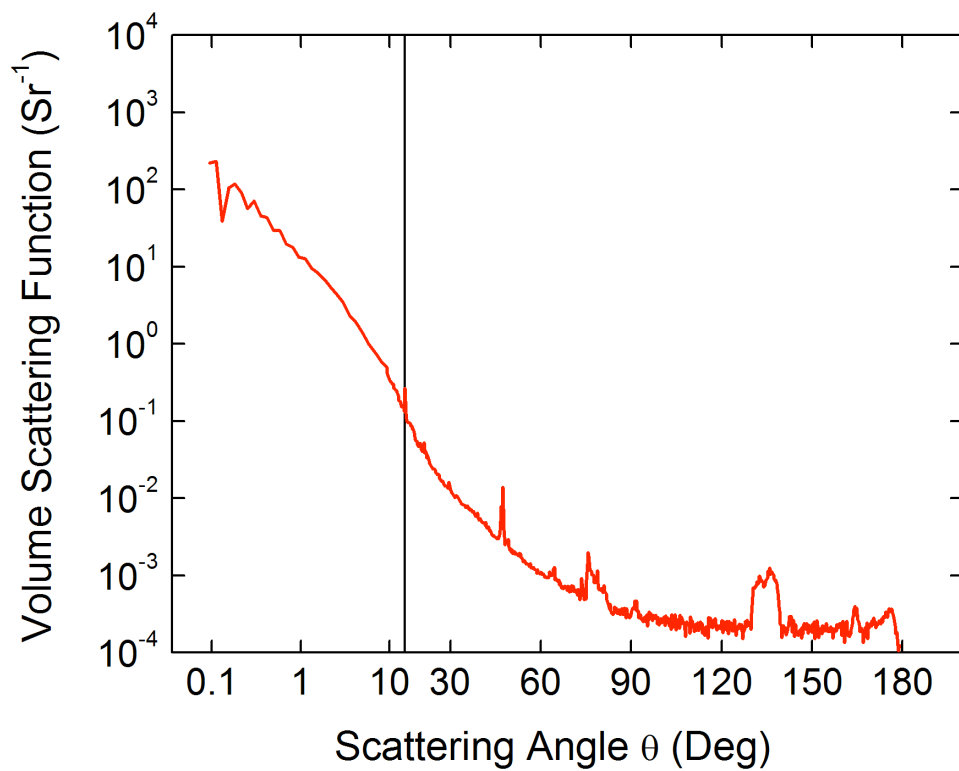
AC9 vs ASD Cast 12 – 60m (PRF2010287_9_corr.dat) CTD 23



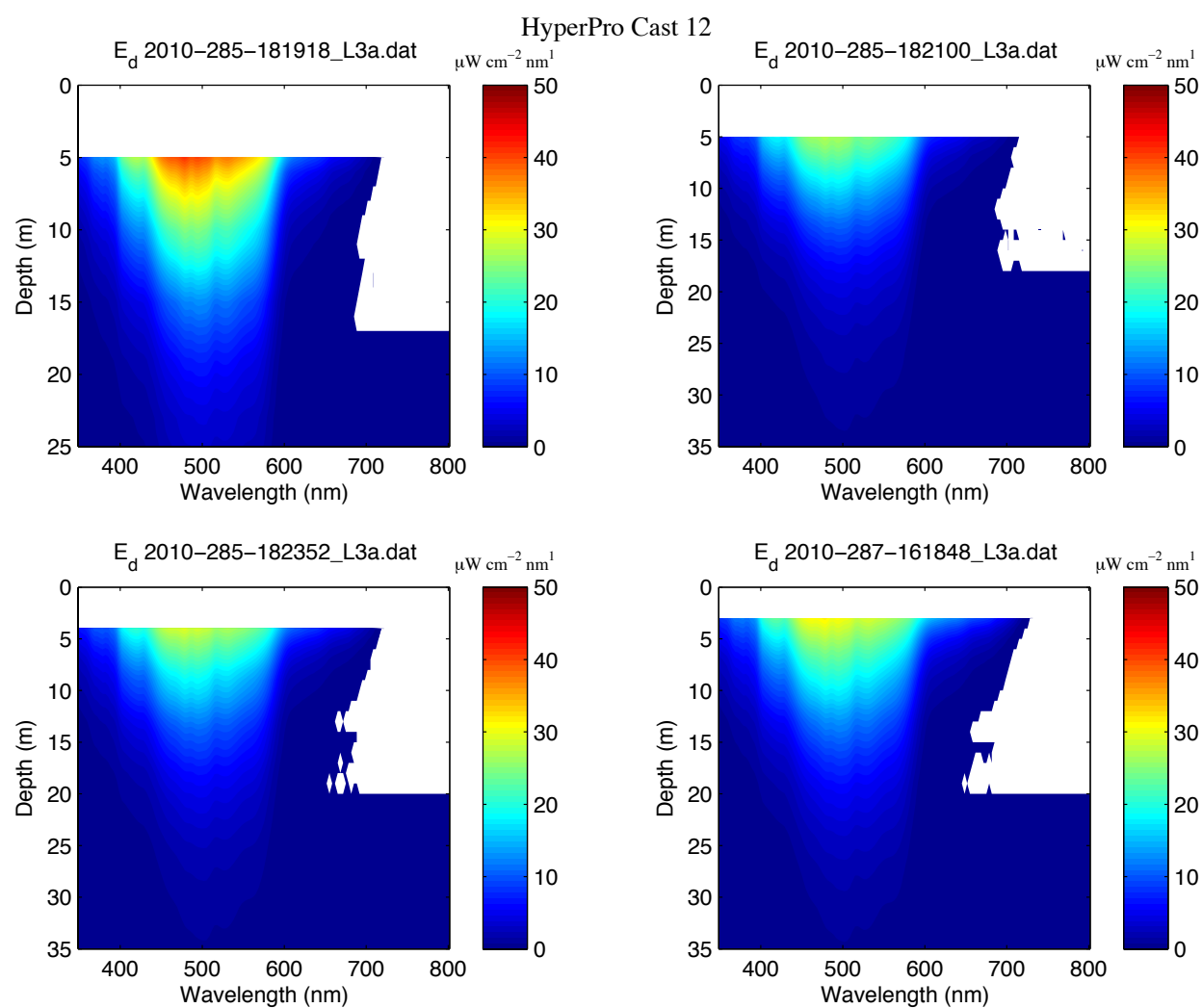
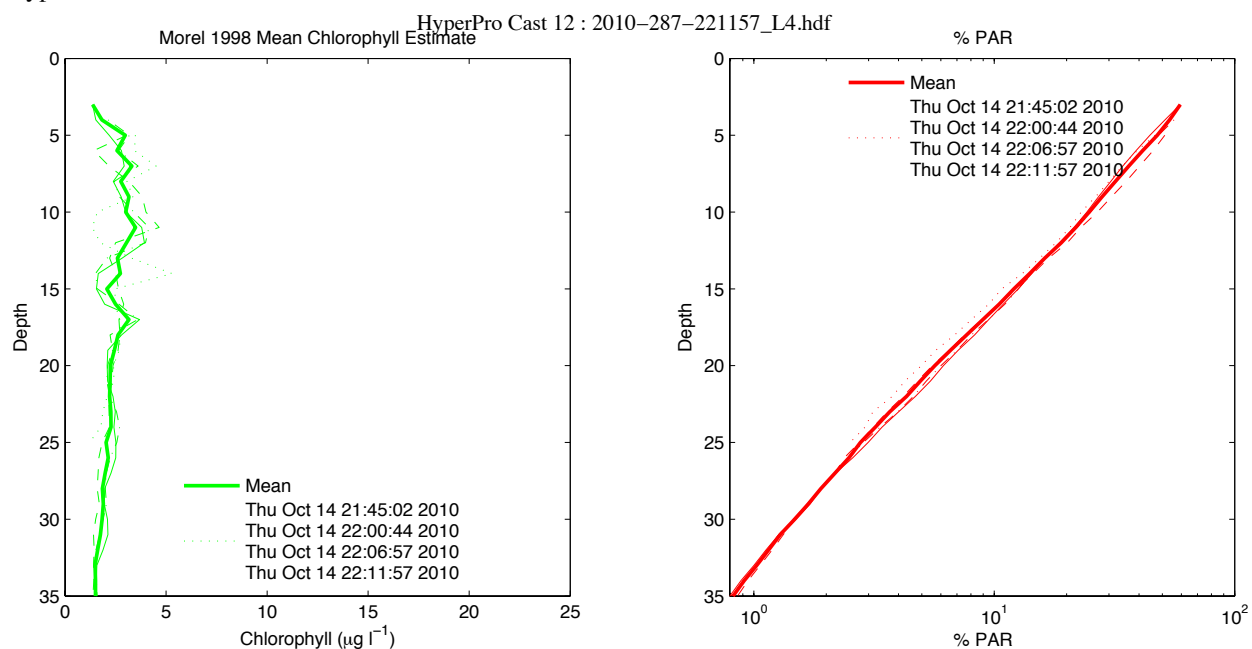
TSS



MVSC (532 nm)



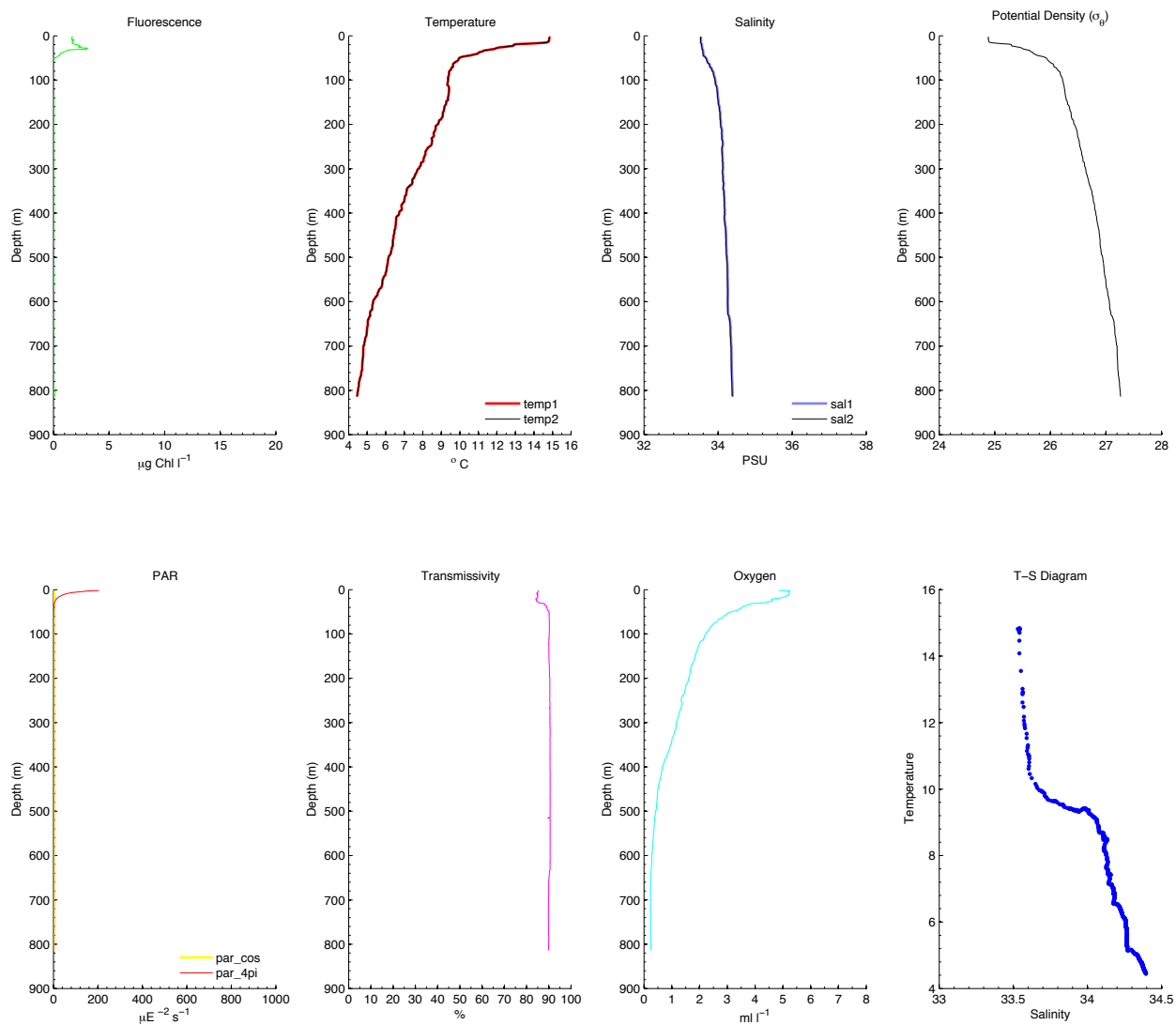
HyperPro



Cast 13 (1700 PDT; [Station BS20](#))
(foggy)

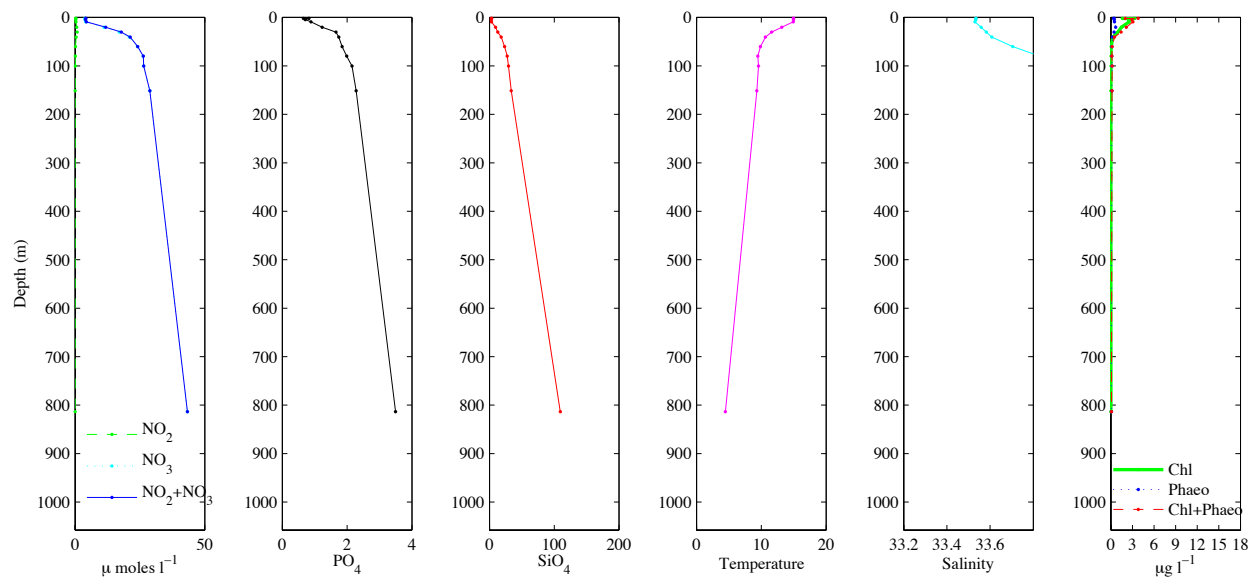
CTD

BIOSPACE 2010 Cast 13 (CTD20; 2010-10-14 23:40:00.000 UTC) CTD Downcast Data (Calibrated)



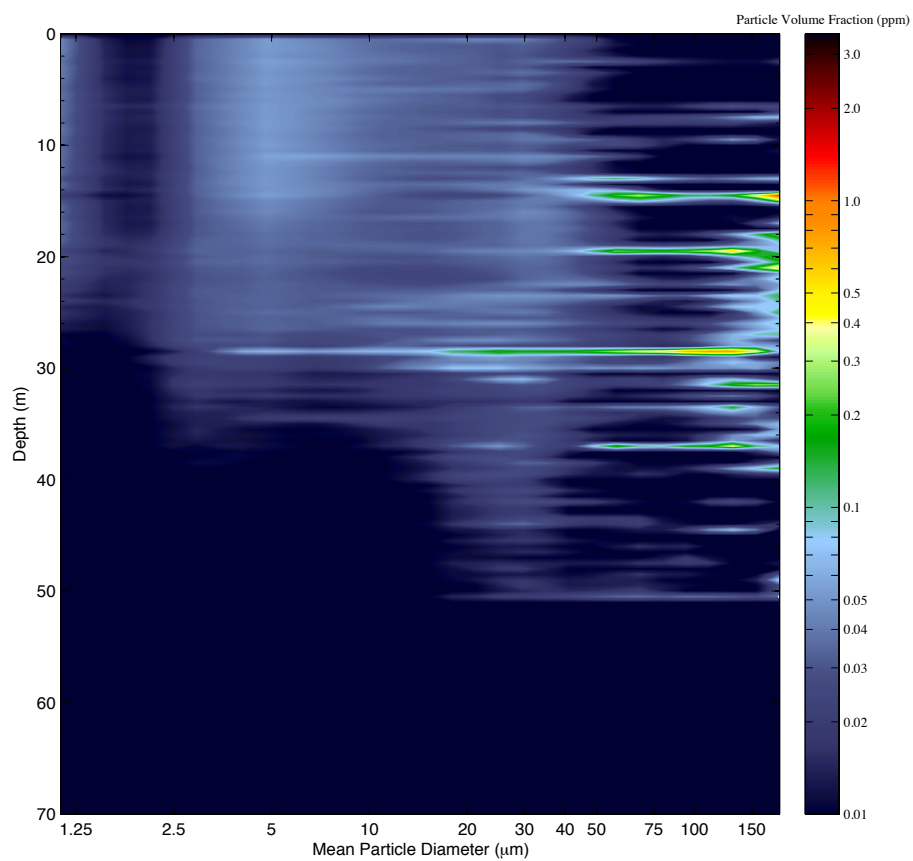
Bottle Nutrients and Chlorophyll

BIOSPACE 2010 Cast 13

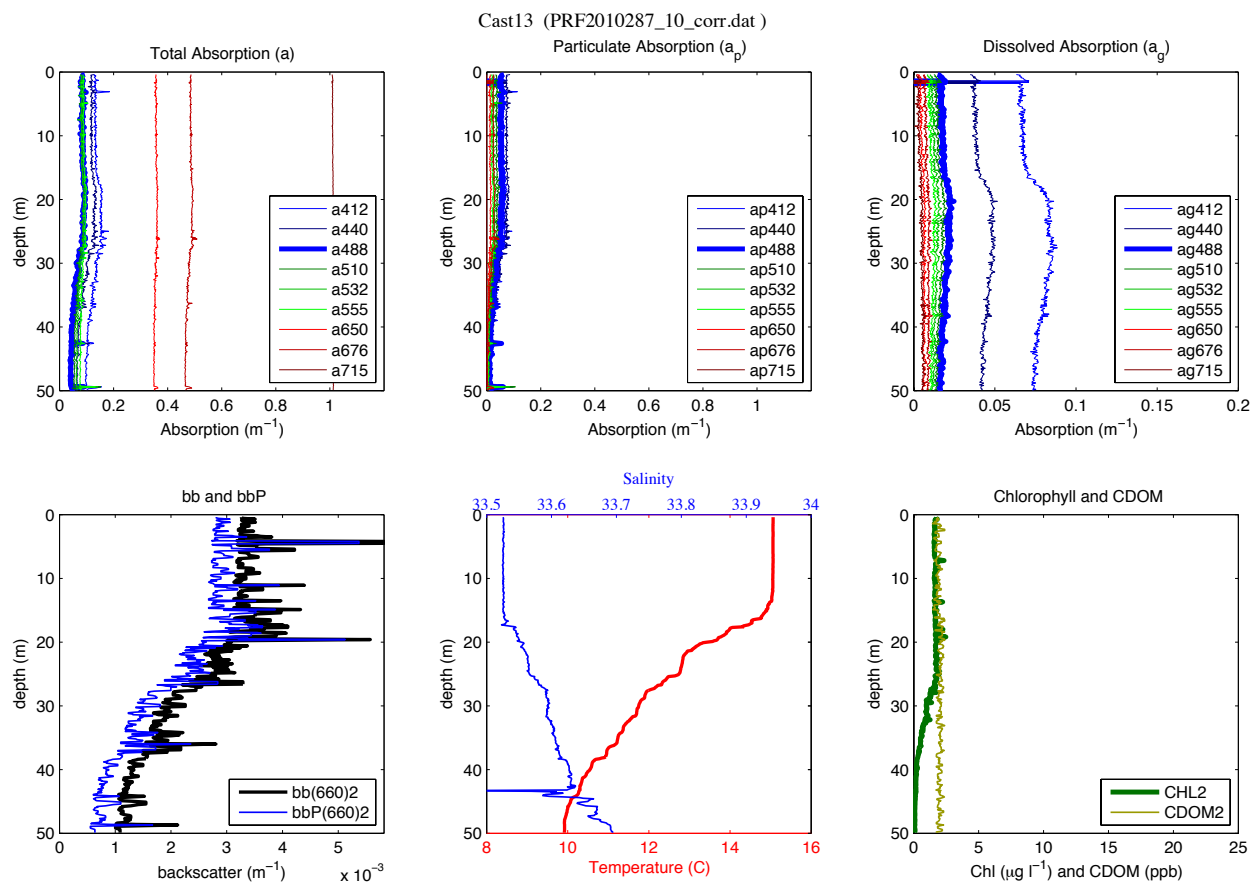


LISST

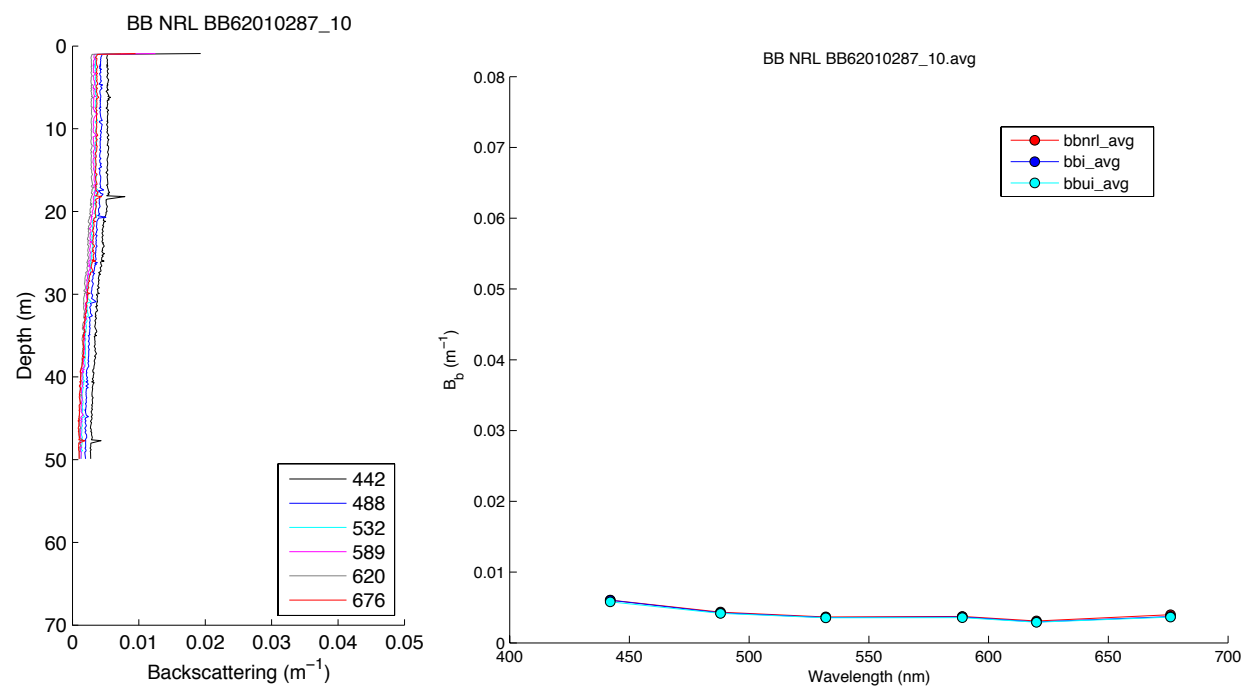
LISST – Cast 13



Optics Profile Package

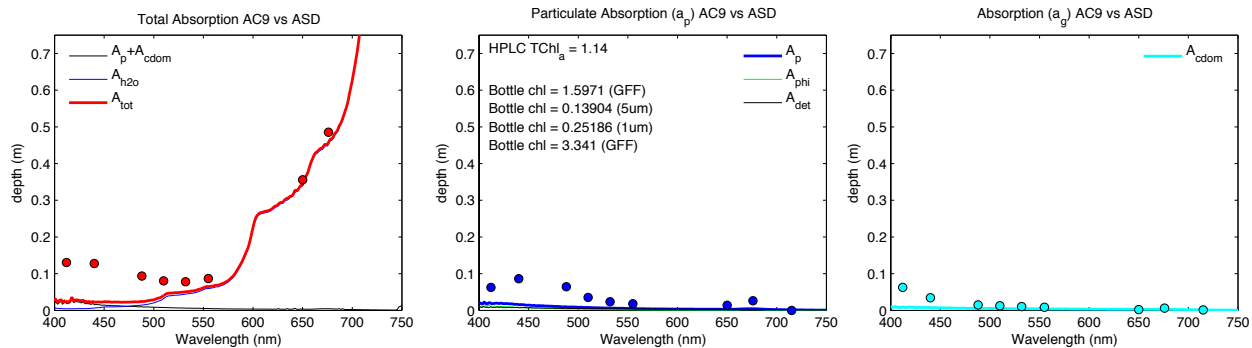


HydroScat

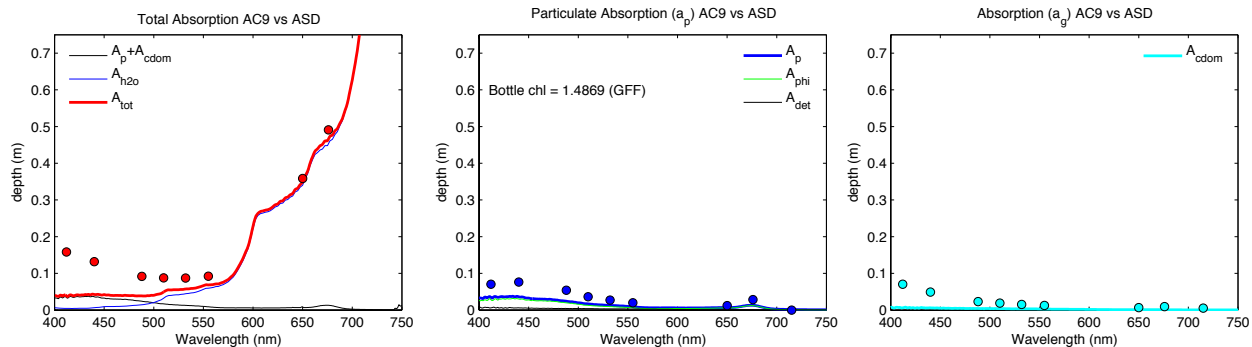


Filter Pad Absorption (w/ AC9)

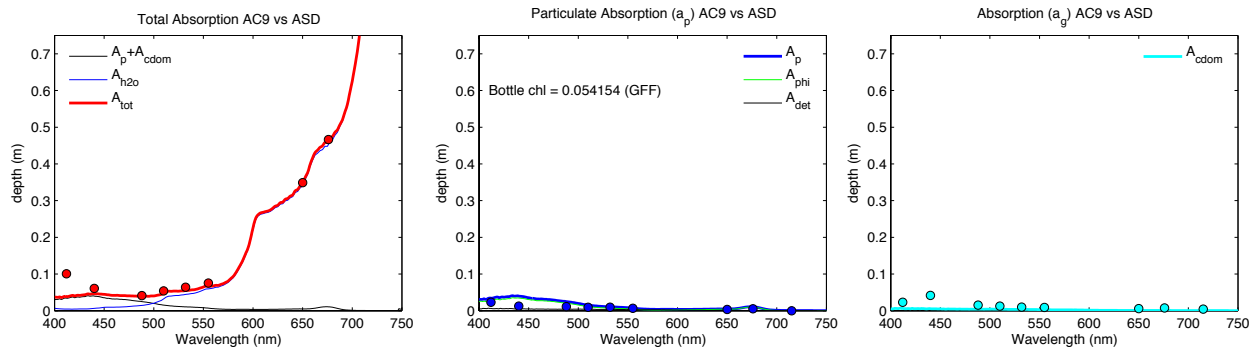
AC9 vs ASD Cast 13 – 0m (PRF2010287_10_corr.dat) CTD 22



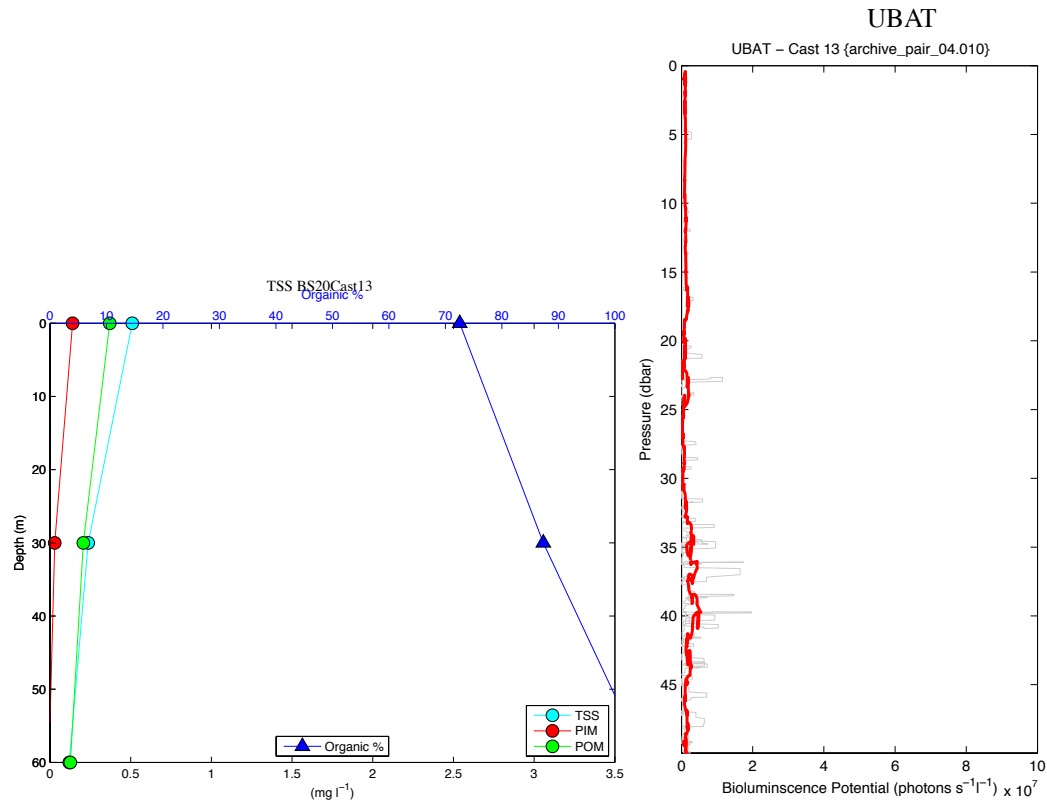
AC9 vs ASD Cast 13 – 20m (PRF2010287_10_corr.dat) CTD 22



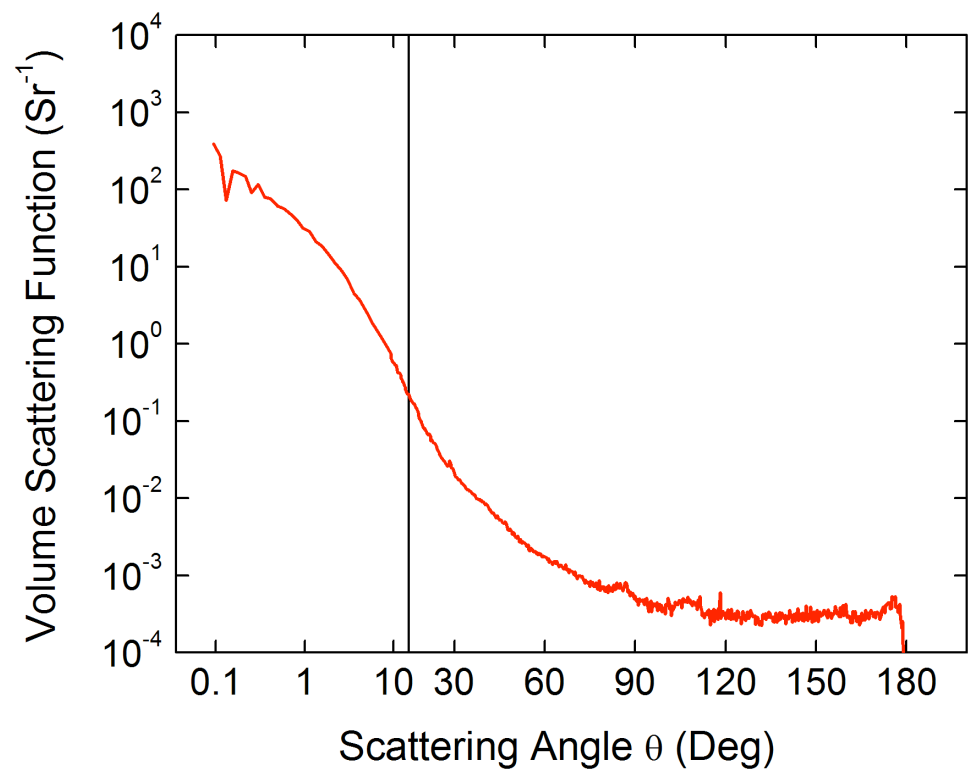
AC9 vs ASD Cast 13 – 60m (PRF2010287_10_corr.dat) CTD 22



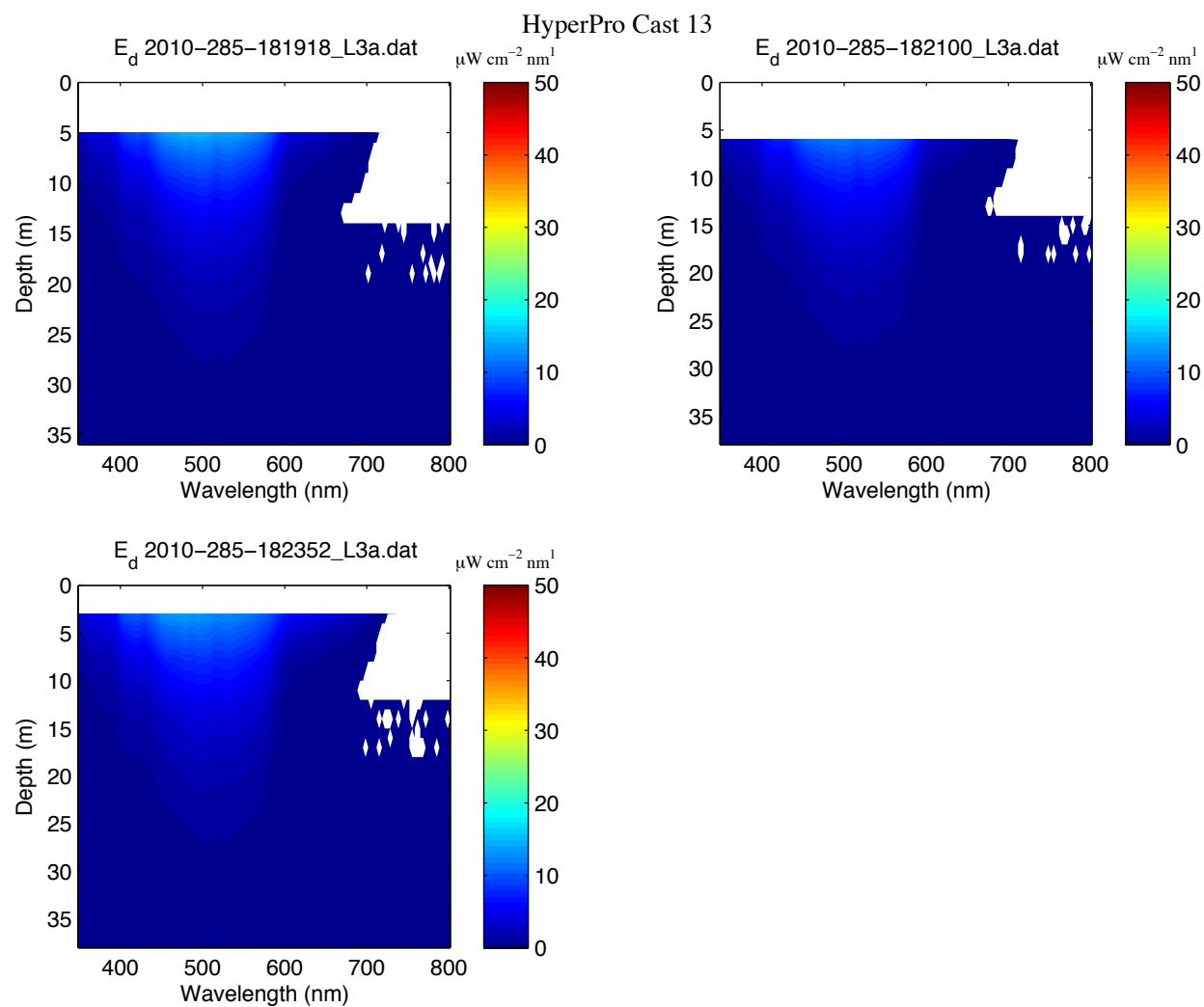
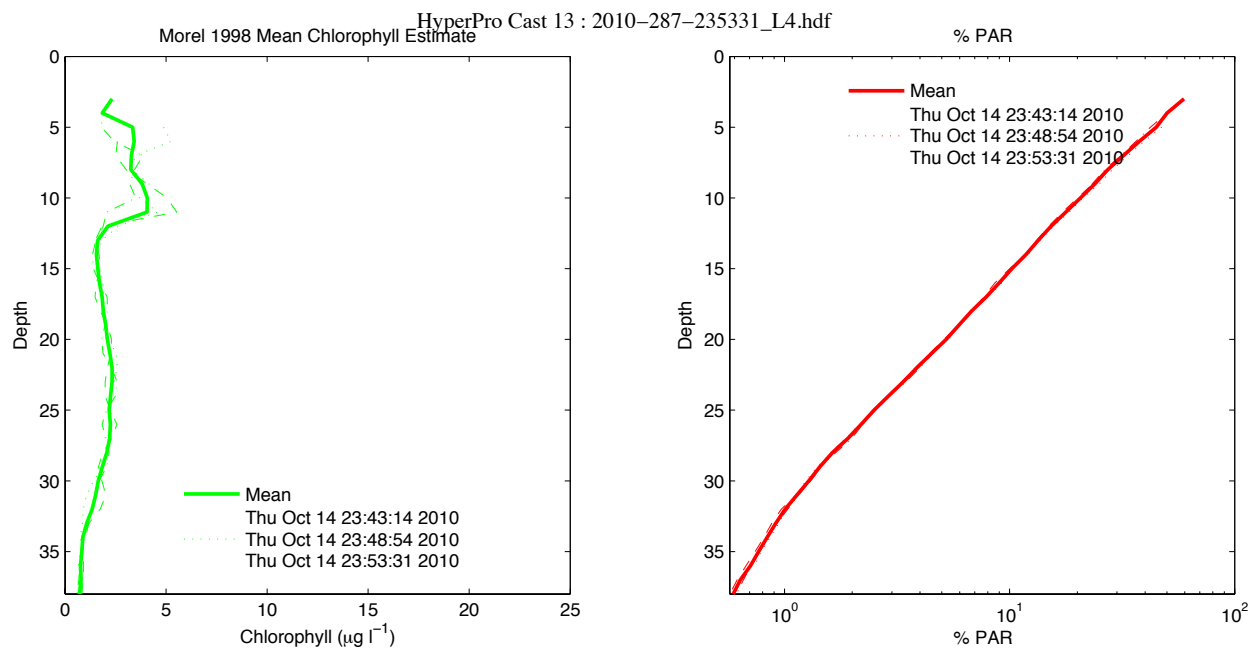
TSS



MVSC (532 nm)



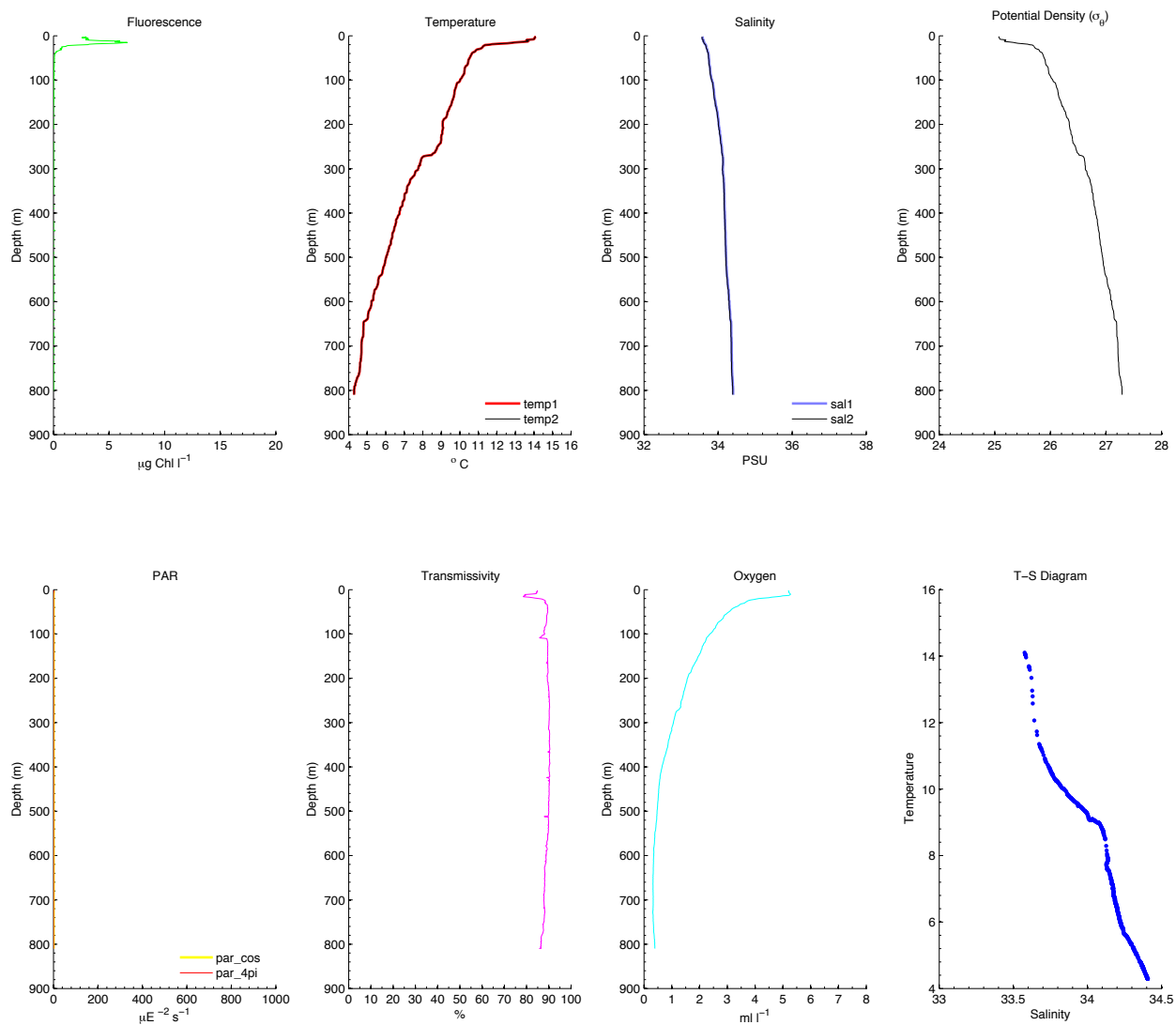
HyperPro



Cast 14 (2000 PDT; [Station BS11](#))
(foggy, dark)

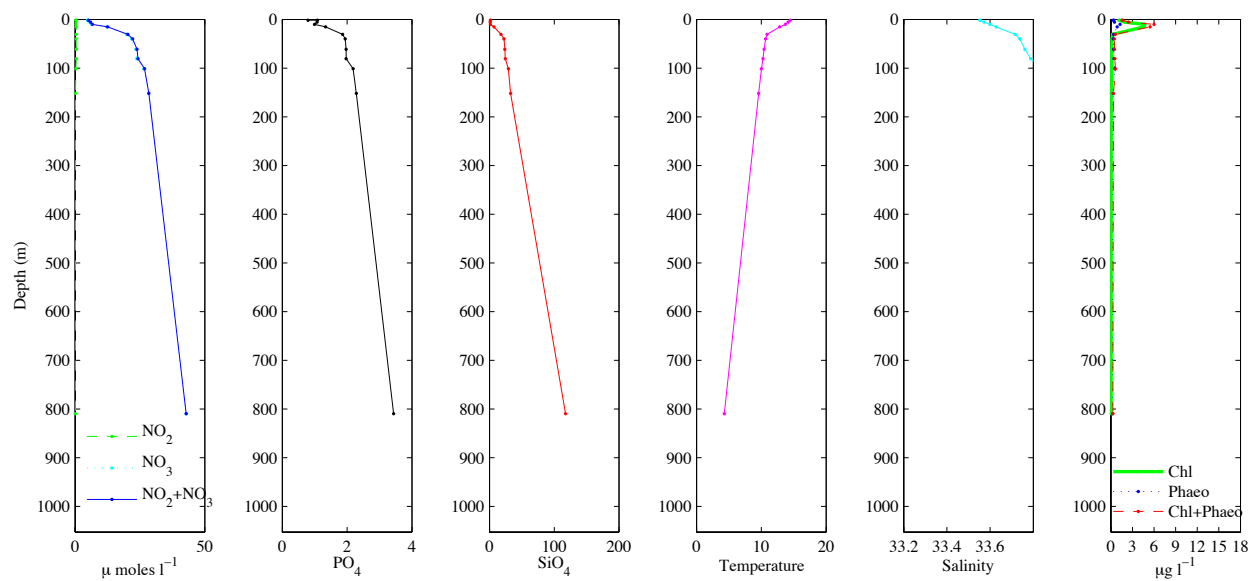
CTD

BIOSPACE 2010 Cast 14 (CTD11; 2010-10-15 03:07:00.000 UTC) CTD Downcast Data (Calibrated)



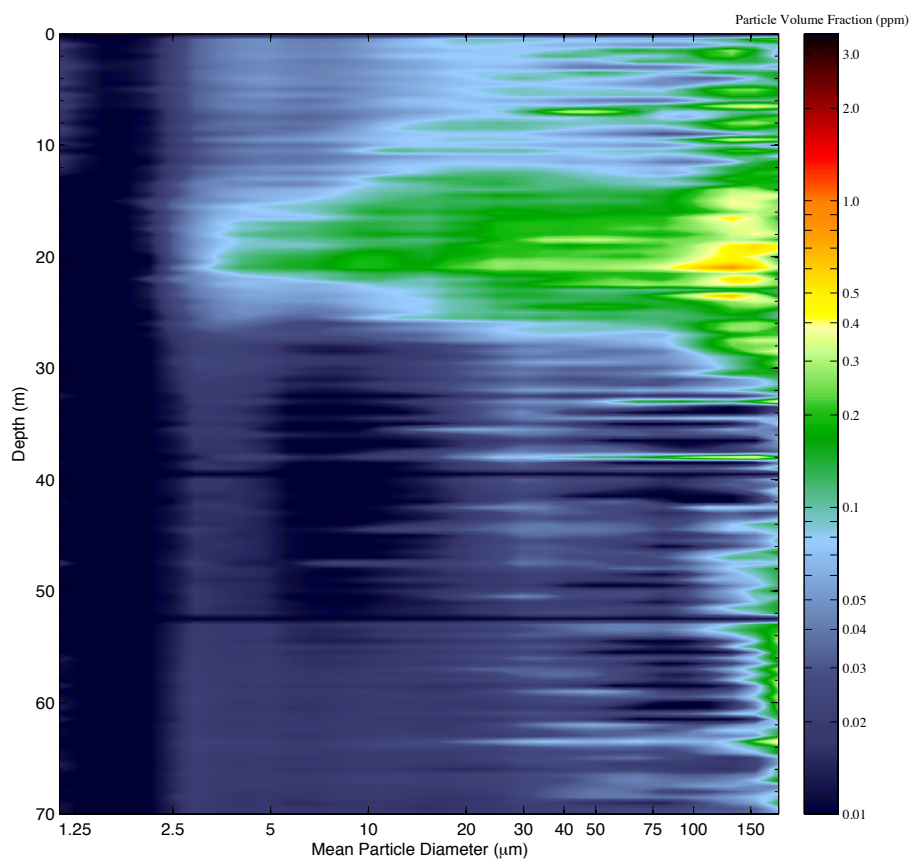
Bottle Nutrients and Chlorophyll

BIOSPACE 2010 Cast 14

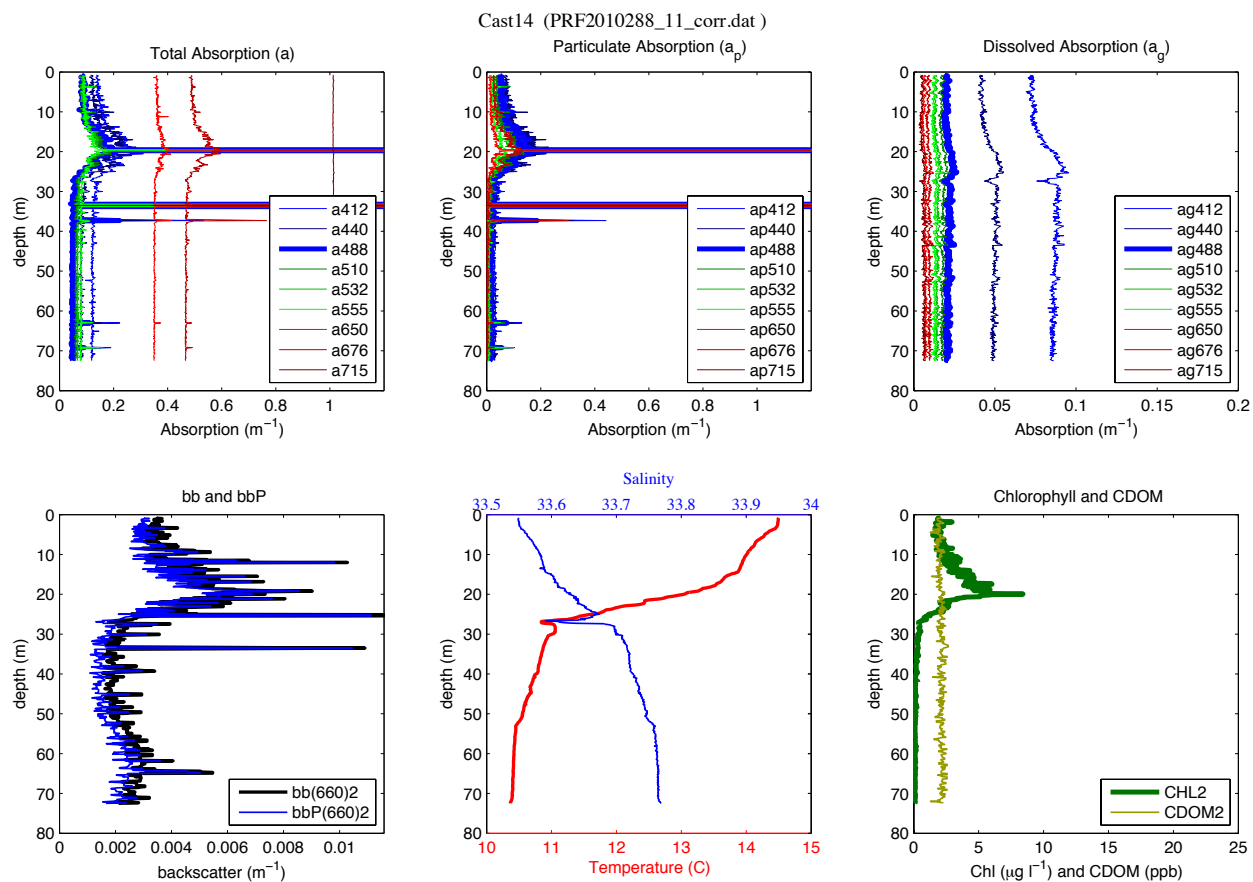


LISST

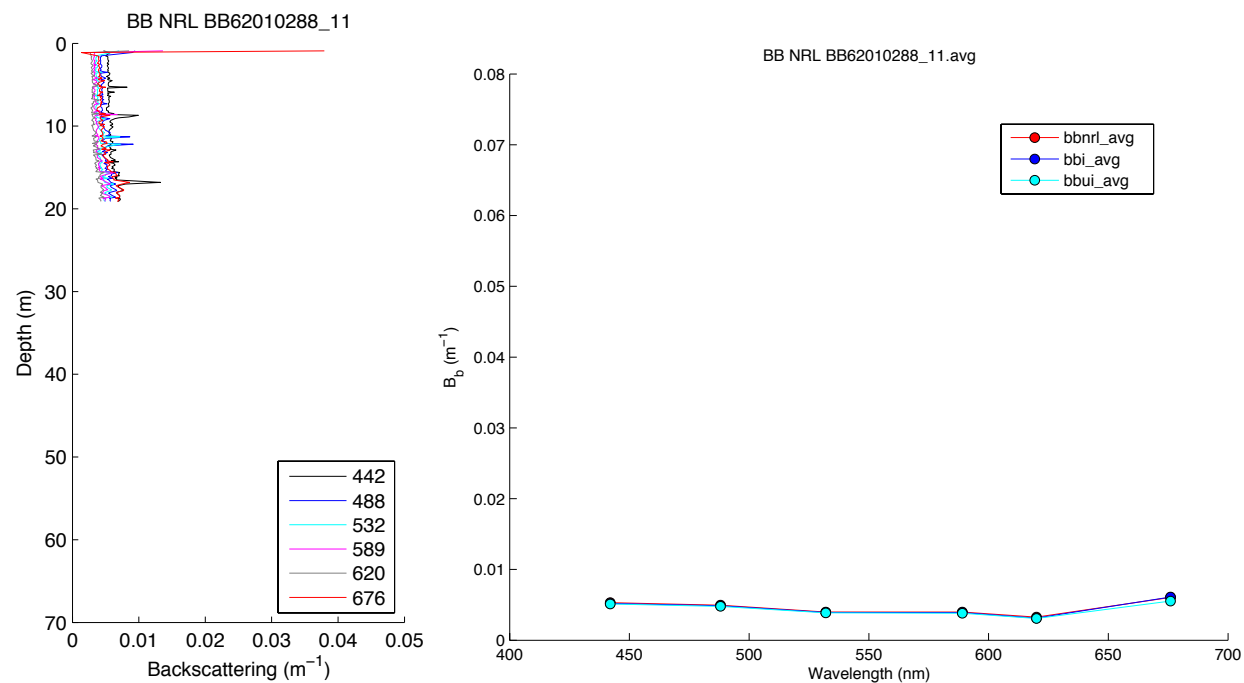
LISST – Cast 14



Optics Profile Package

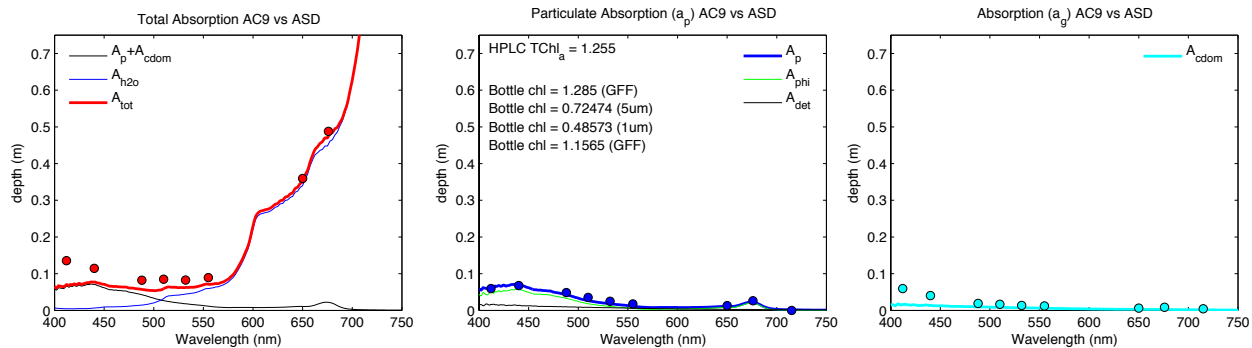


HydroScat

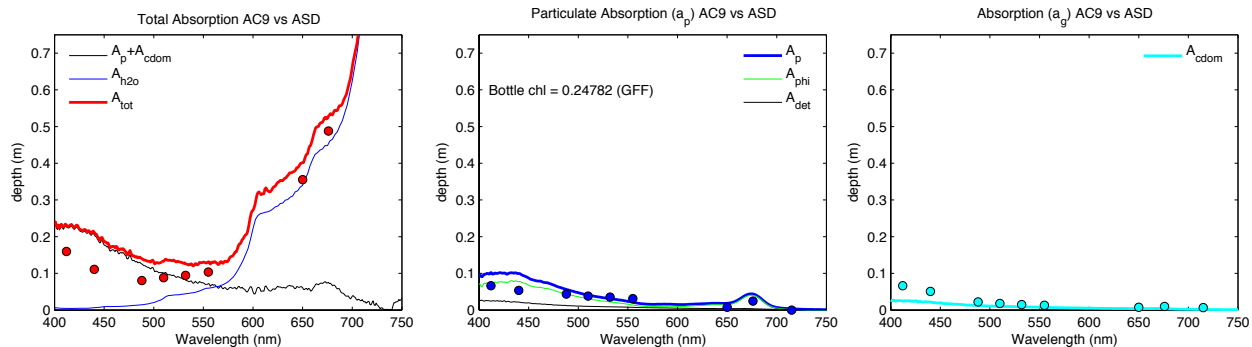


Filter Pad Absorption (w/ AC9)

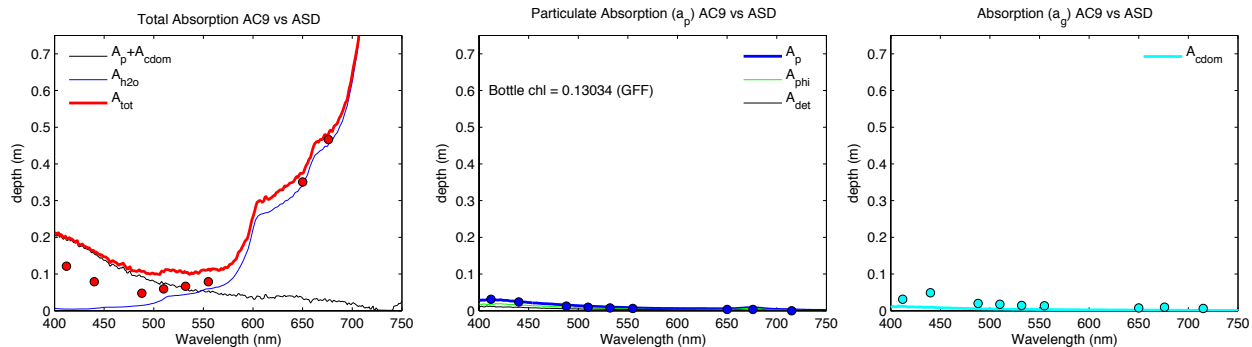
AC9 vs ASD Cast 14 – 0m (PRF2010288_11_corr.dat) CTD 21



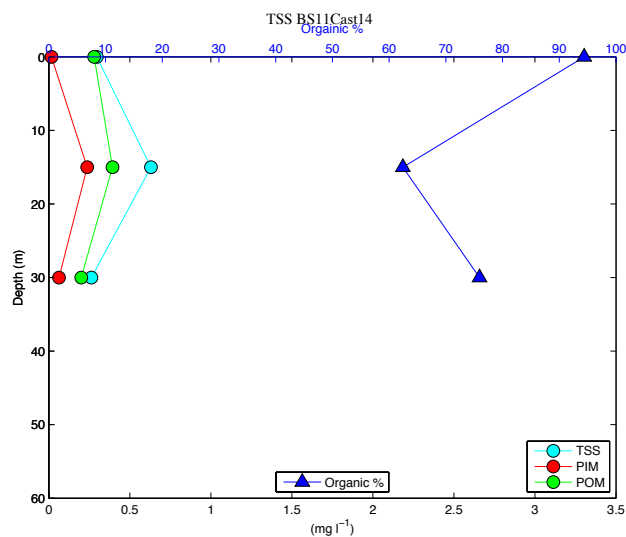
AC9 vs ASD Cast 14 – 30m (PRF2010288_11_corr.dat) CTD 21



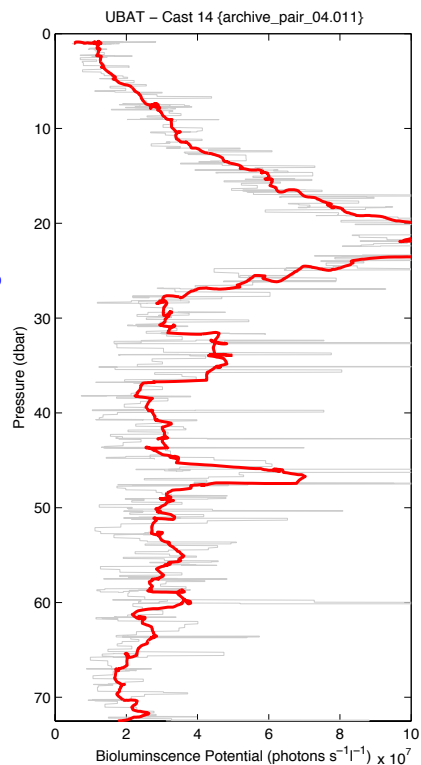
AC9 vs ASD Cast 14 – 60m (PRF2010288_11_corr.dat) CTD 21



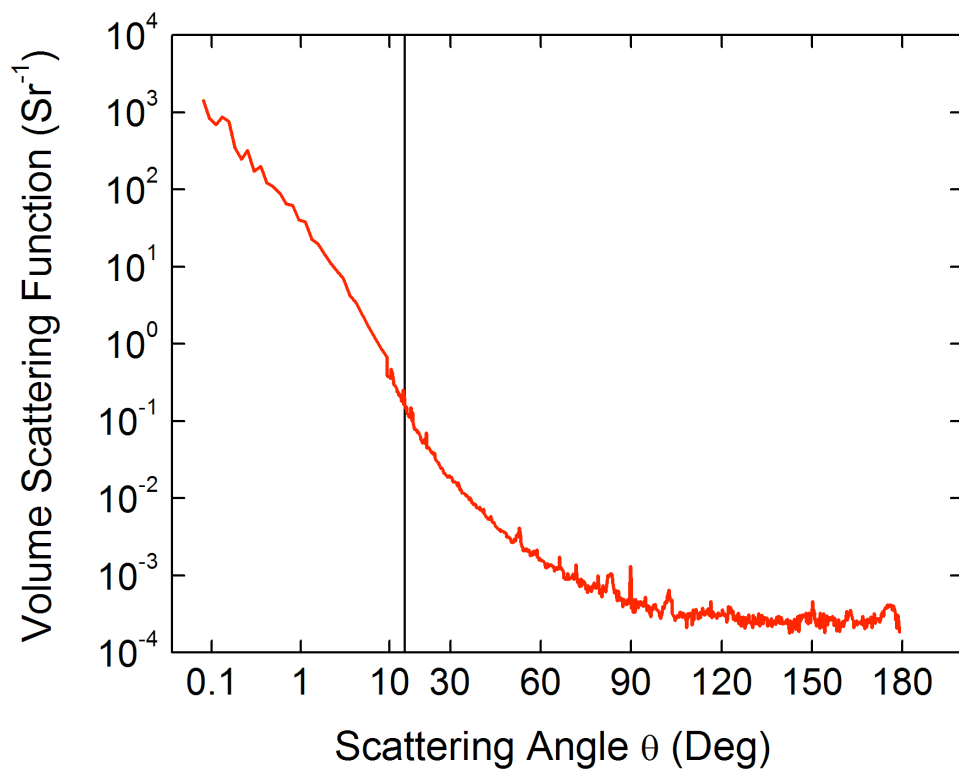
TSS



UBAT



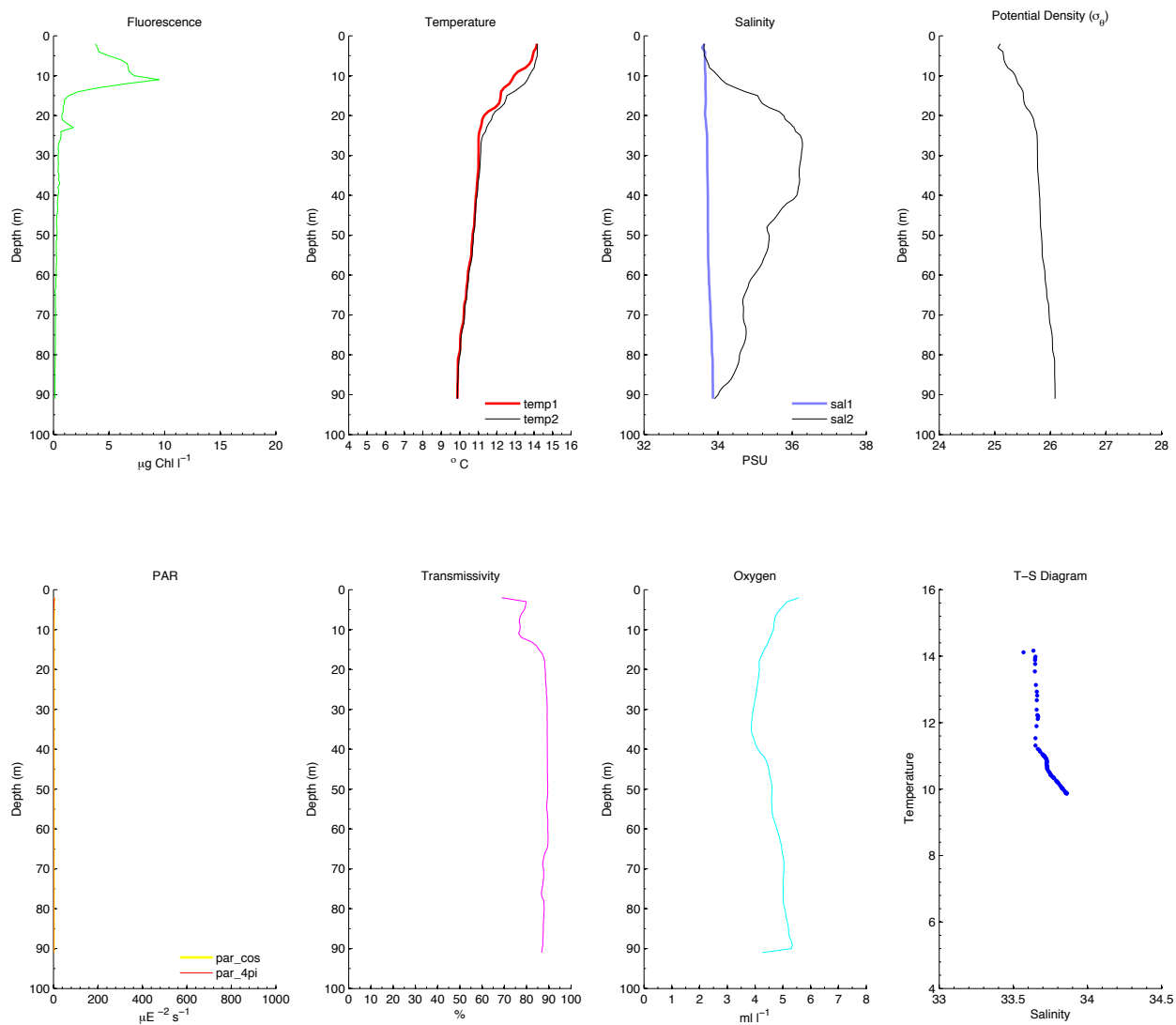
MVSC (532 nm)



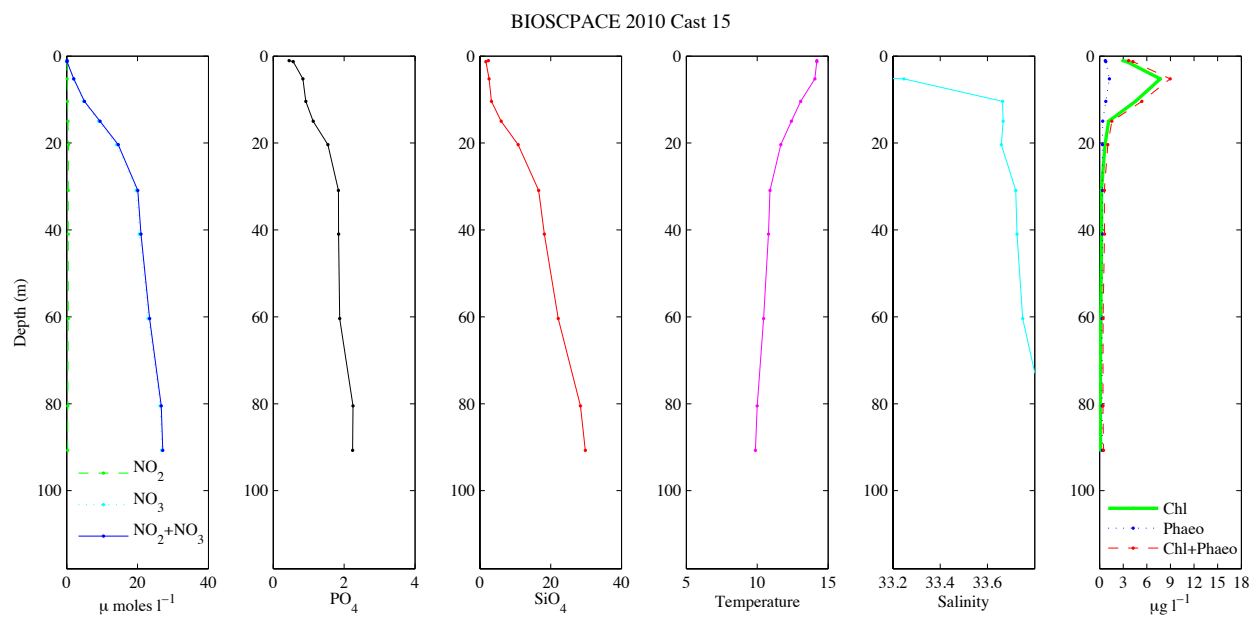
Cast 15 (2150 PDT; [Station BS28](#))
(Jellies) (foggy, dark)

CTD

BIOSPACE 2010 Cast 15 (CTD28; 2010-10-15 04:45:00.000 UTC) CTD Downcast Data (Calibrated)

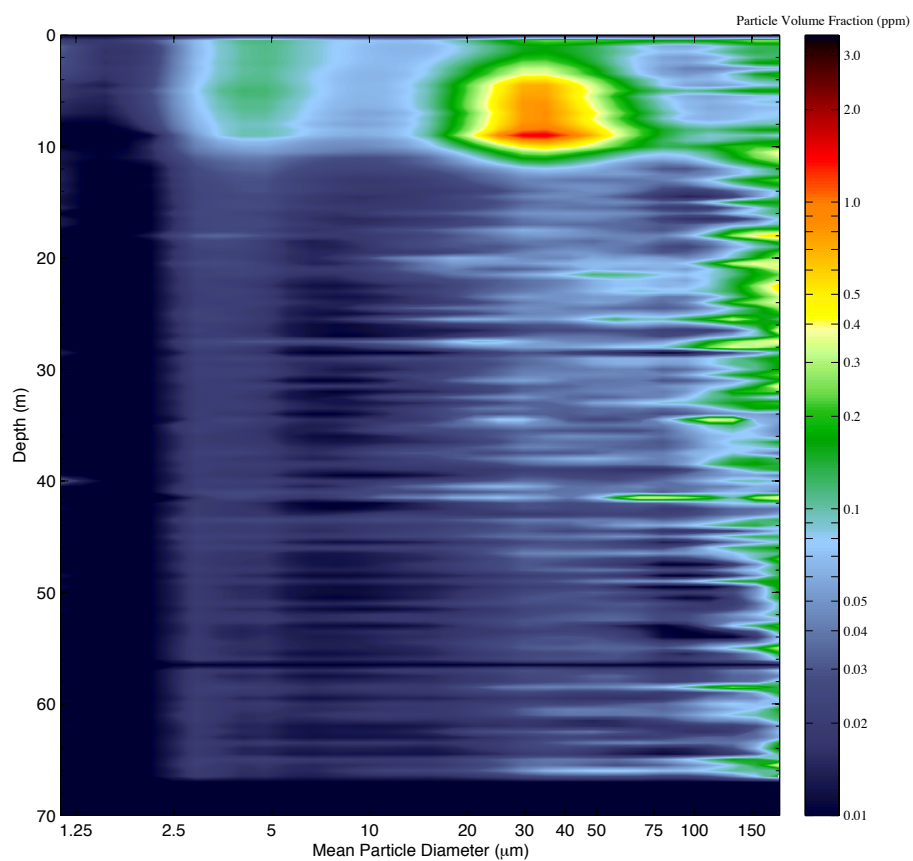


Bottle Nutrients and Chlorophyll

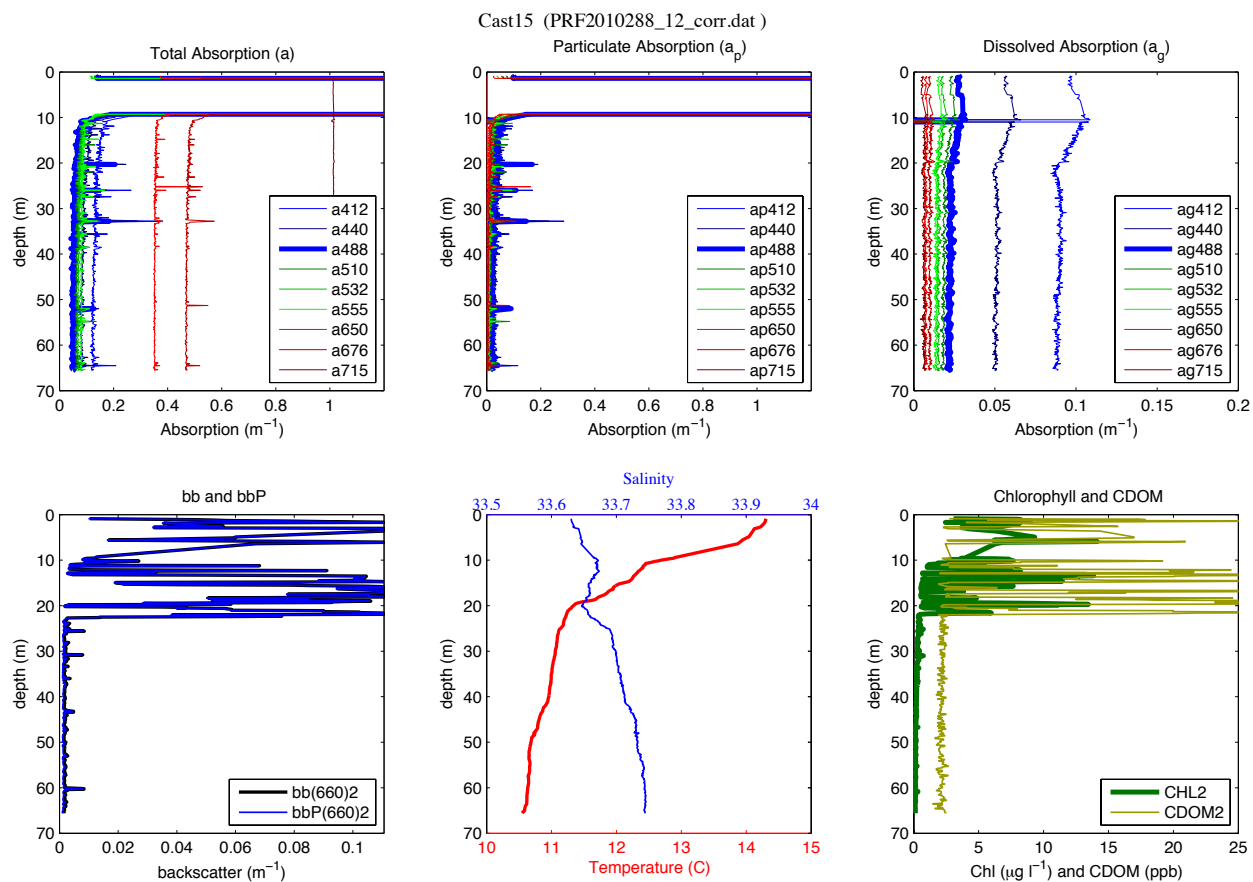


LISST

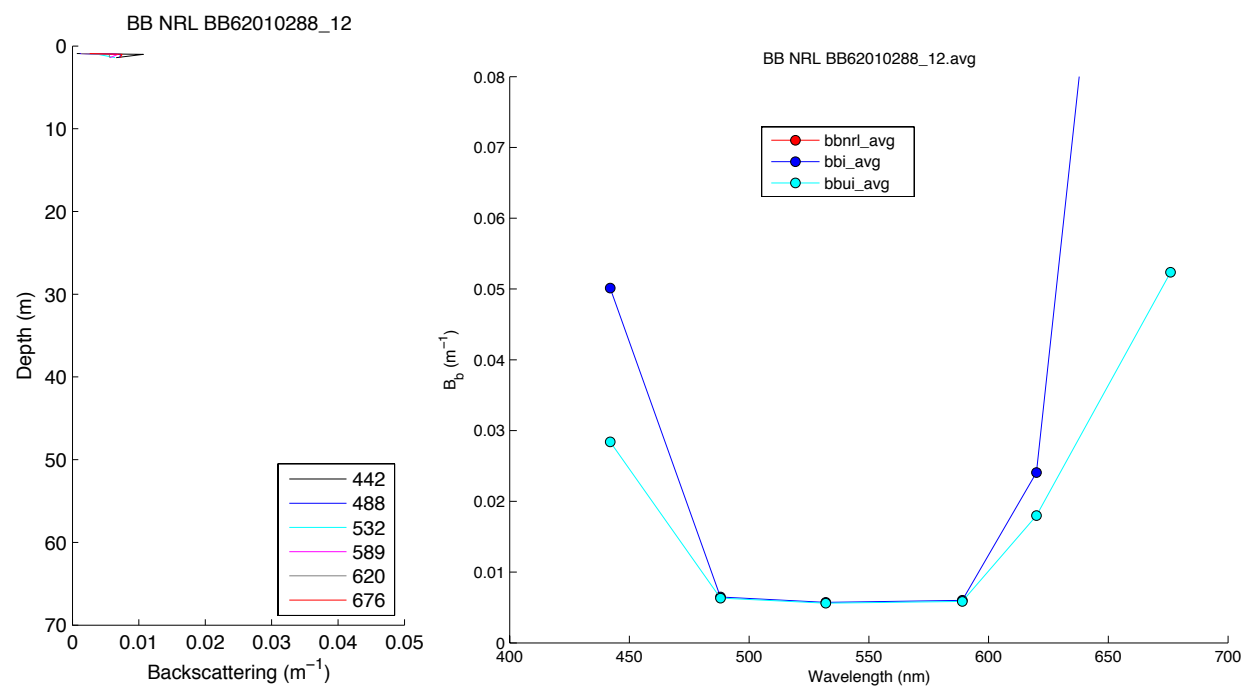
LISST – Cast 15



Optics Profile Package

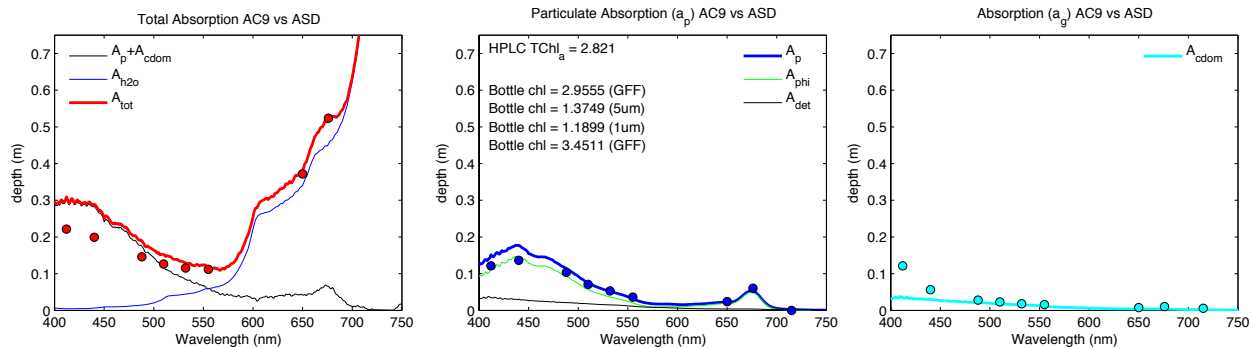


HydroScat

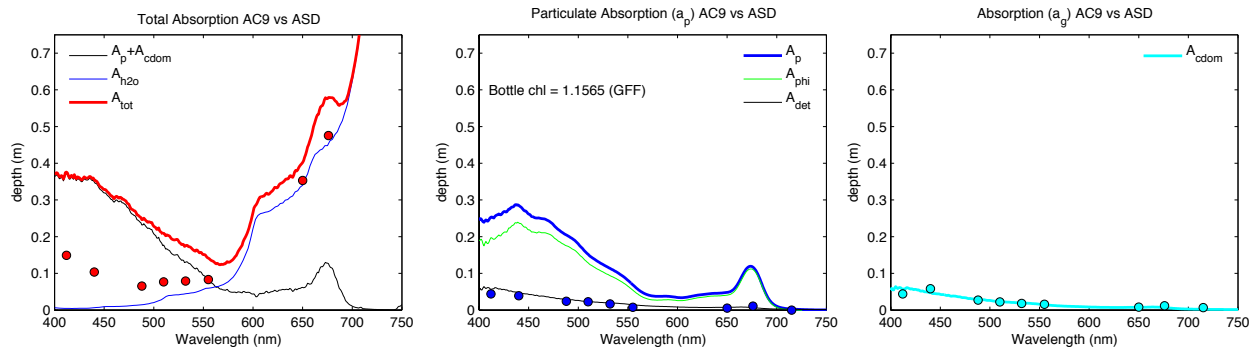


Filter Pad Absorption (w/ AC9)

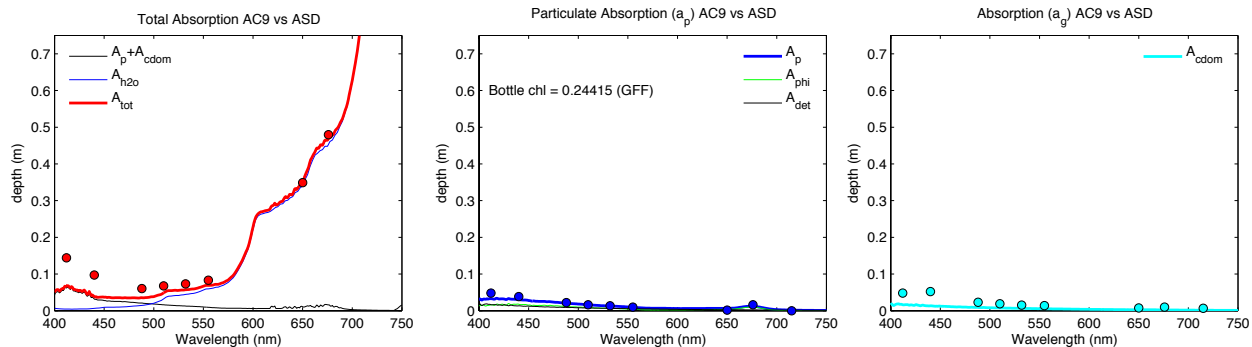
AC9 vs ASD Cast 15 – 0m (PRF2010288_12_corr.dat) CTD 20



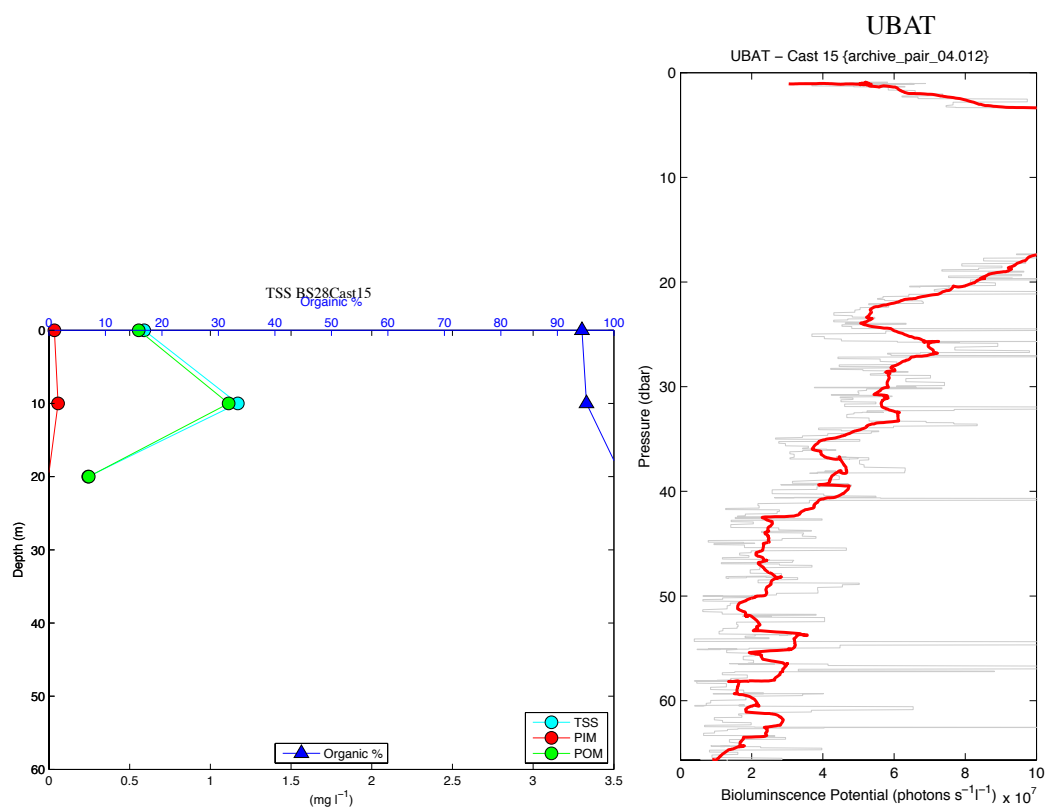
AC9 vs ASD Cast 15 – 15m (PRF2010288_12_corr.dat) CTD 20



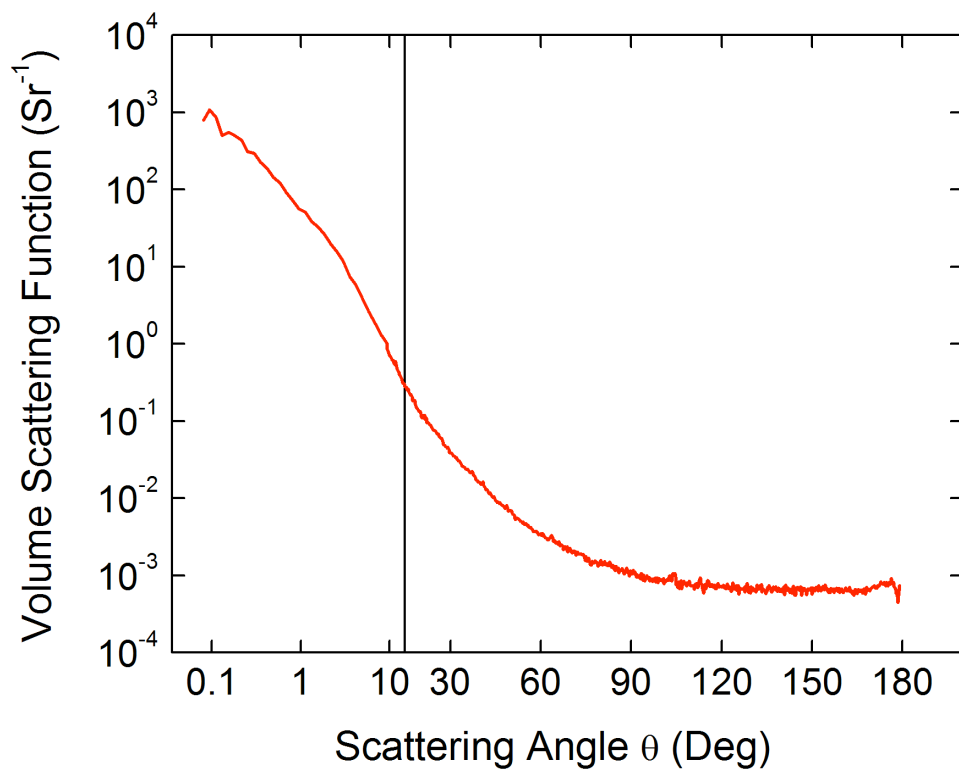
AC9 vs ASD Cast 15 – 30m (PRF2010288_12_corr.dat) CTD 20



TSS



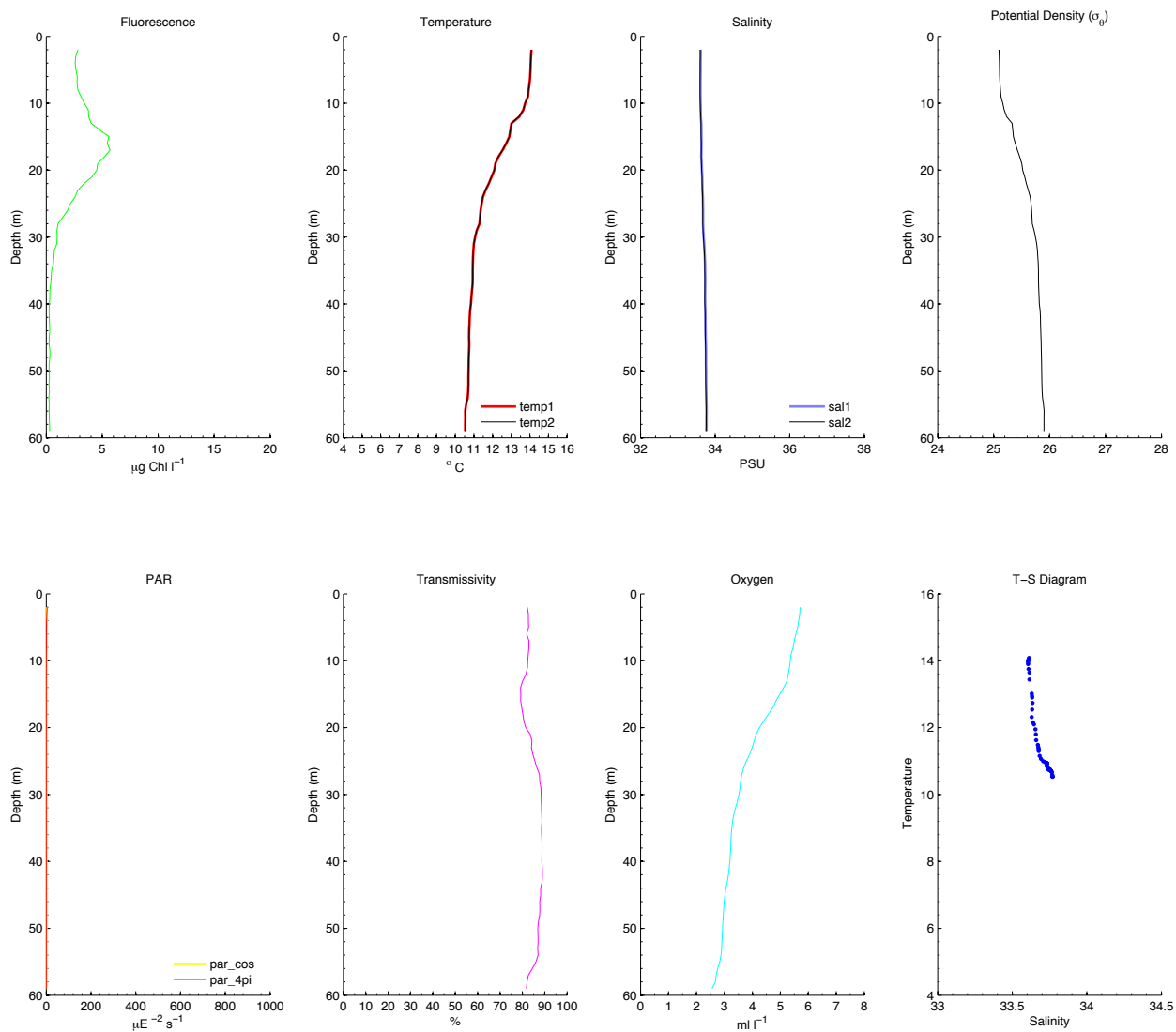
MVSC (532 nm)



Cast 16 (2254 PDT; [Station BS29](#))
(lots of jellies) (foggy, dark)

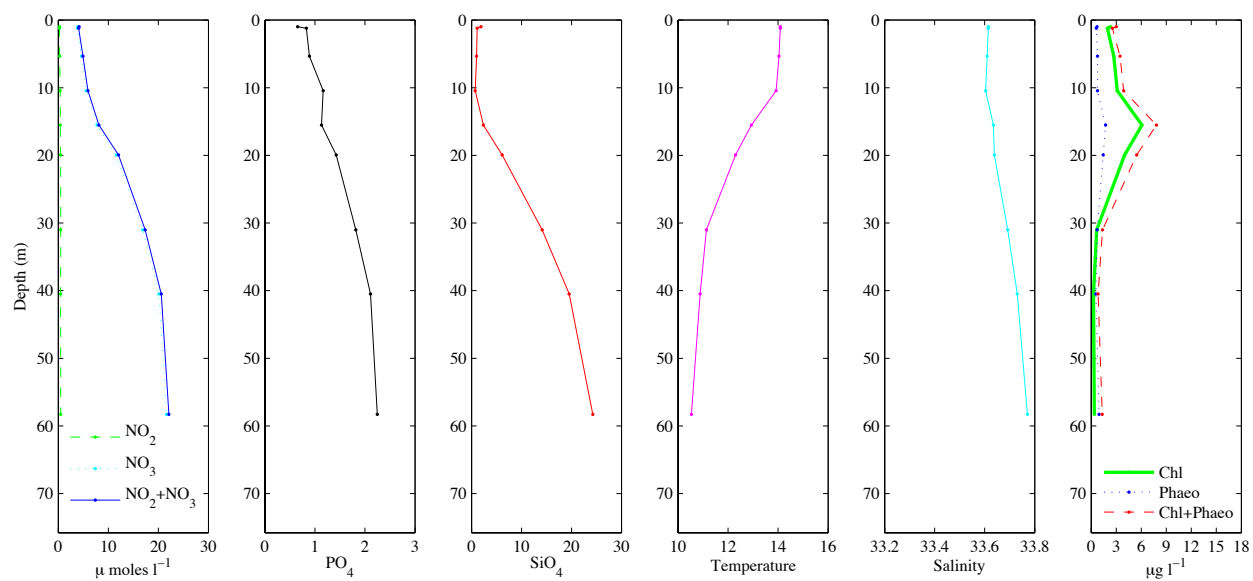
CTD

BIOSPACE 2010 Cast 16 (CTD29; 2010-10-15 05:54:00.000 UTC) CTD Downcast Data (Calibrated)



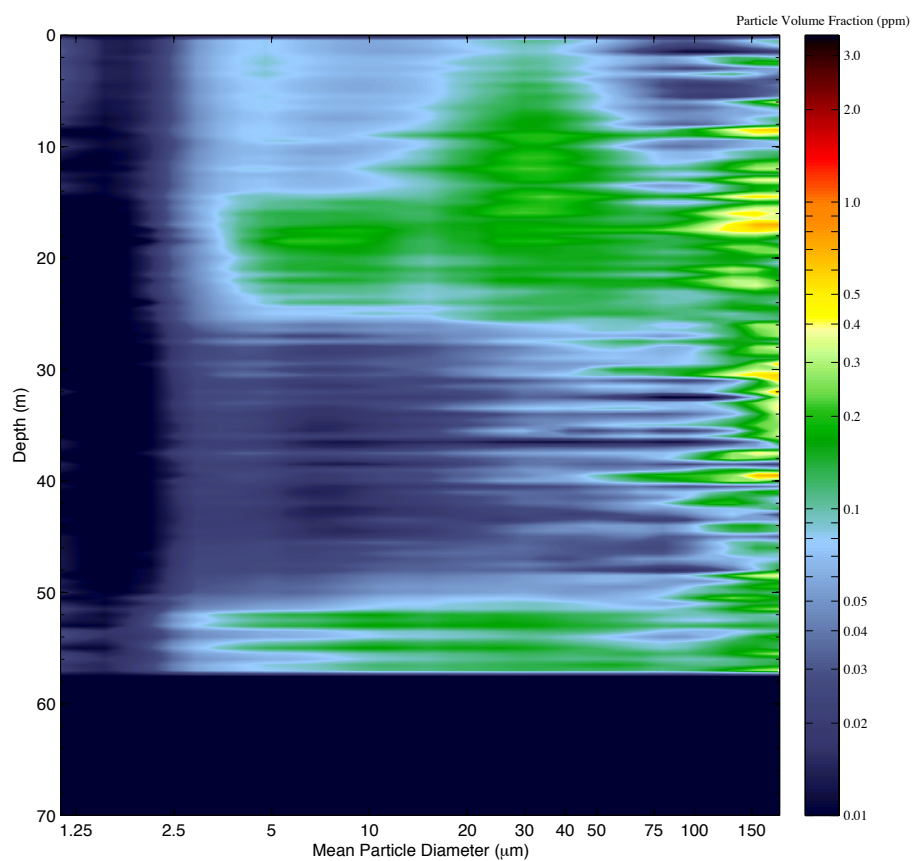
Bottle Nutrients and Chlorophyll

BIOSPACE 2010 Cast 16

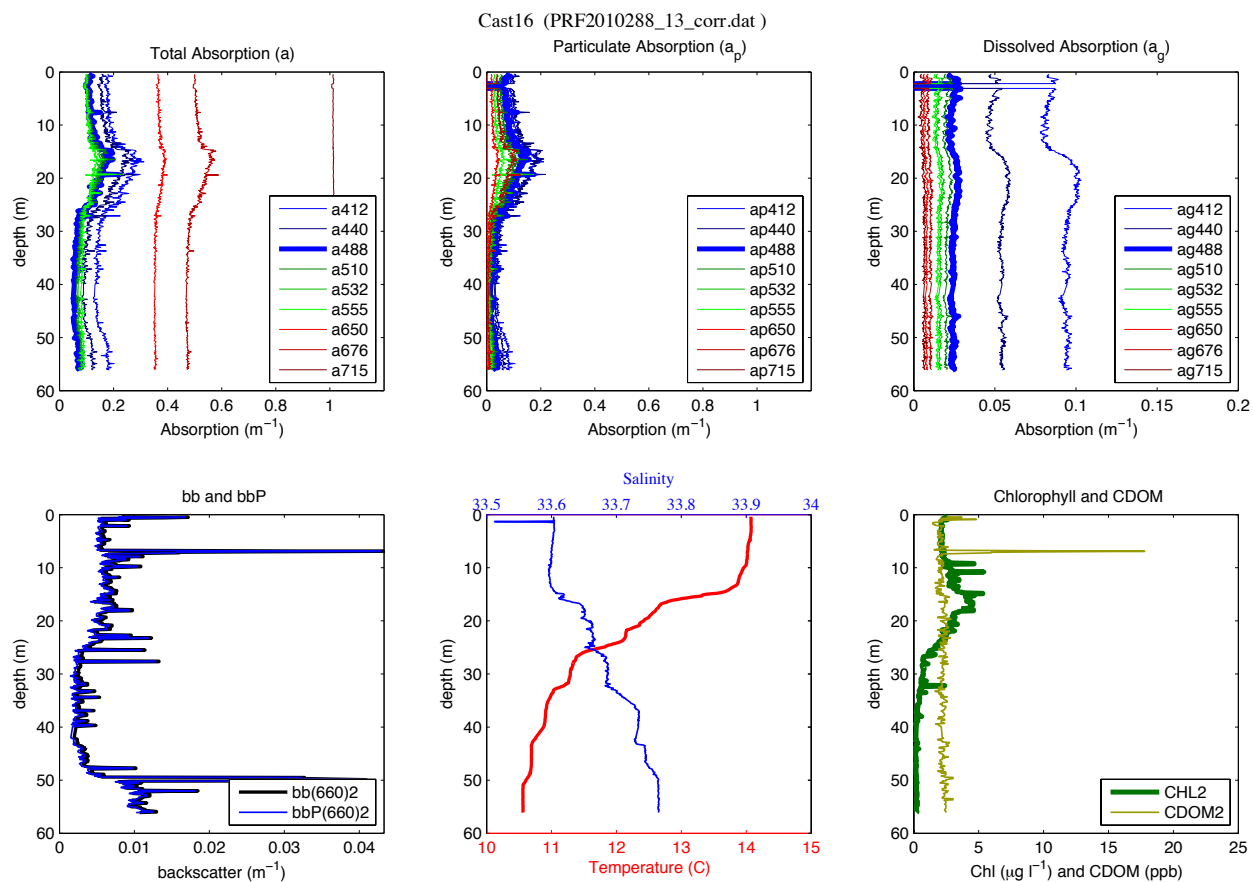


LISST

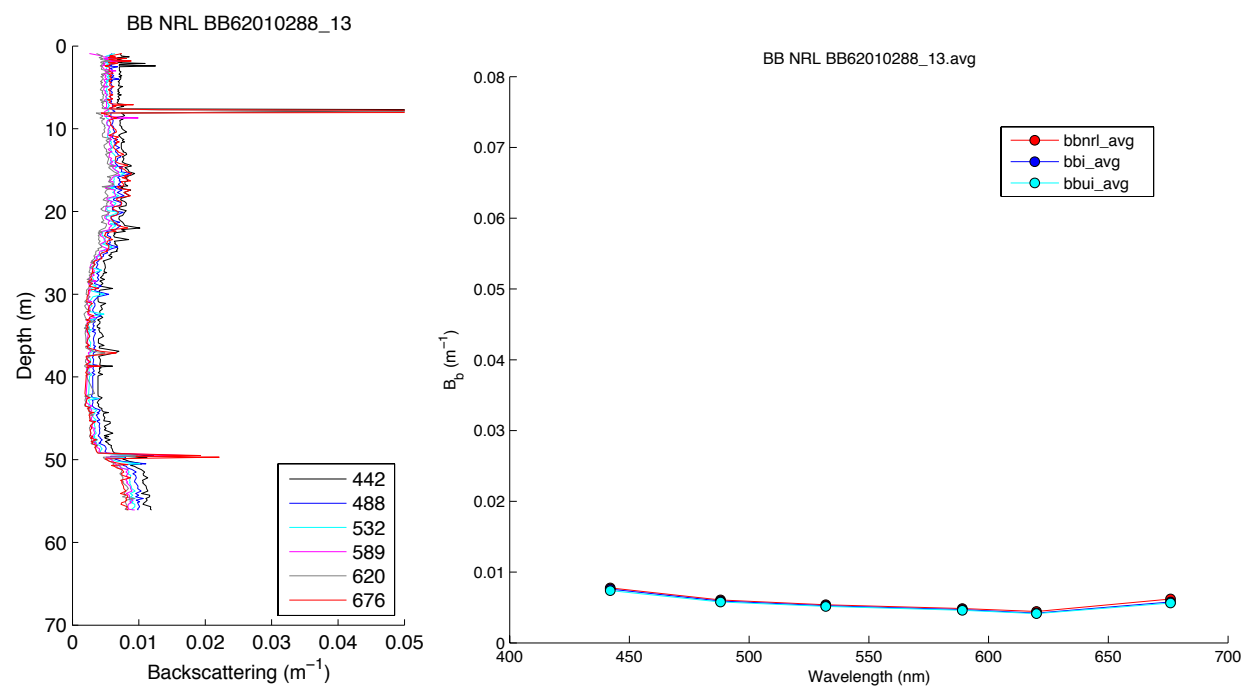
LISST – Cast 16



Optics Profile Package

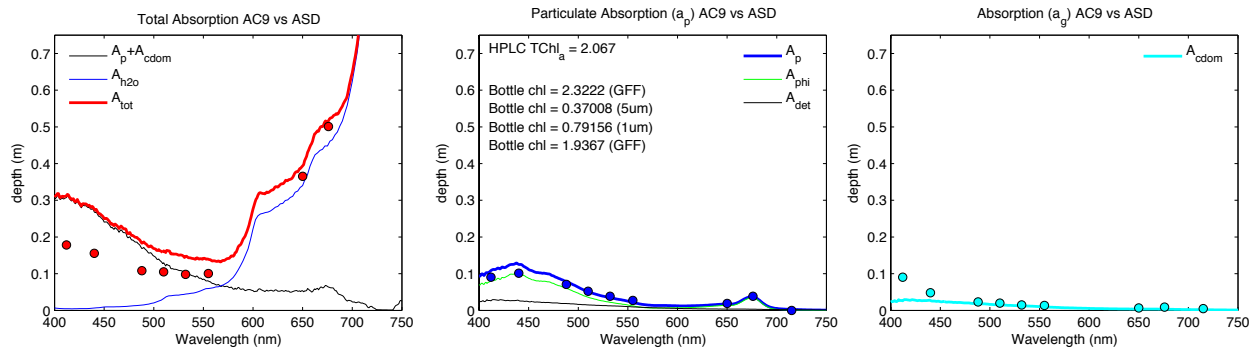


HydroScat

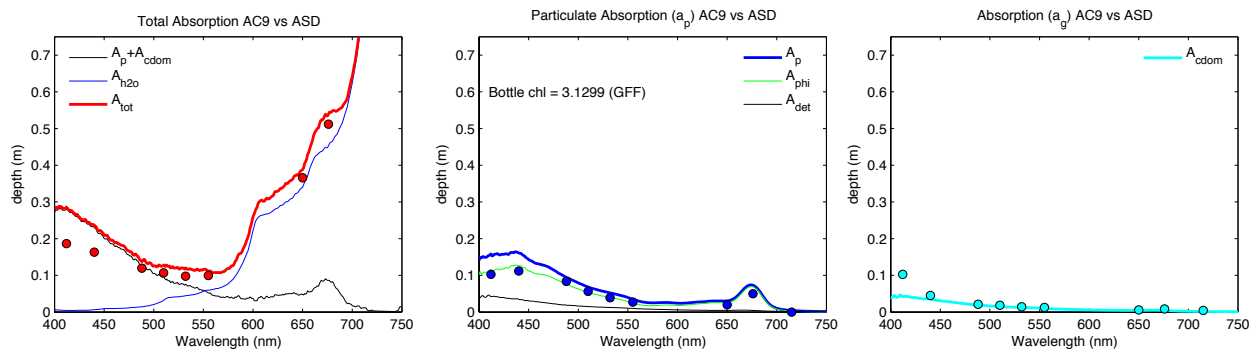


Filter Pad Absorption (w/ AC9)

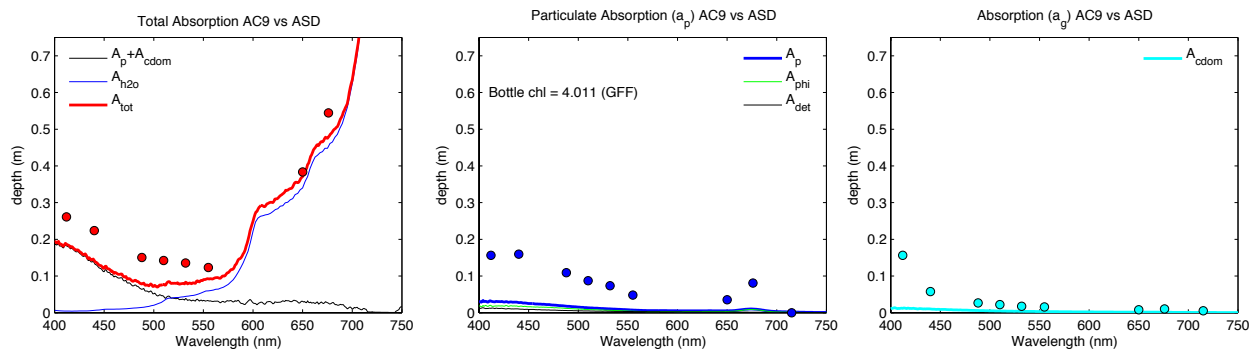
AC9 vs ASD Cast 16 – 0m (PRF2010288_13_corr.dat) CTD 11



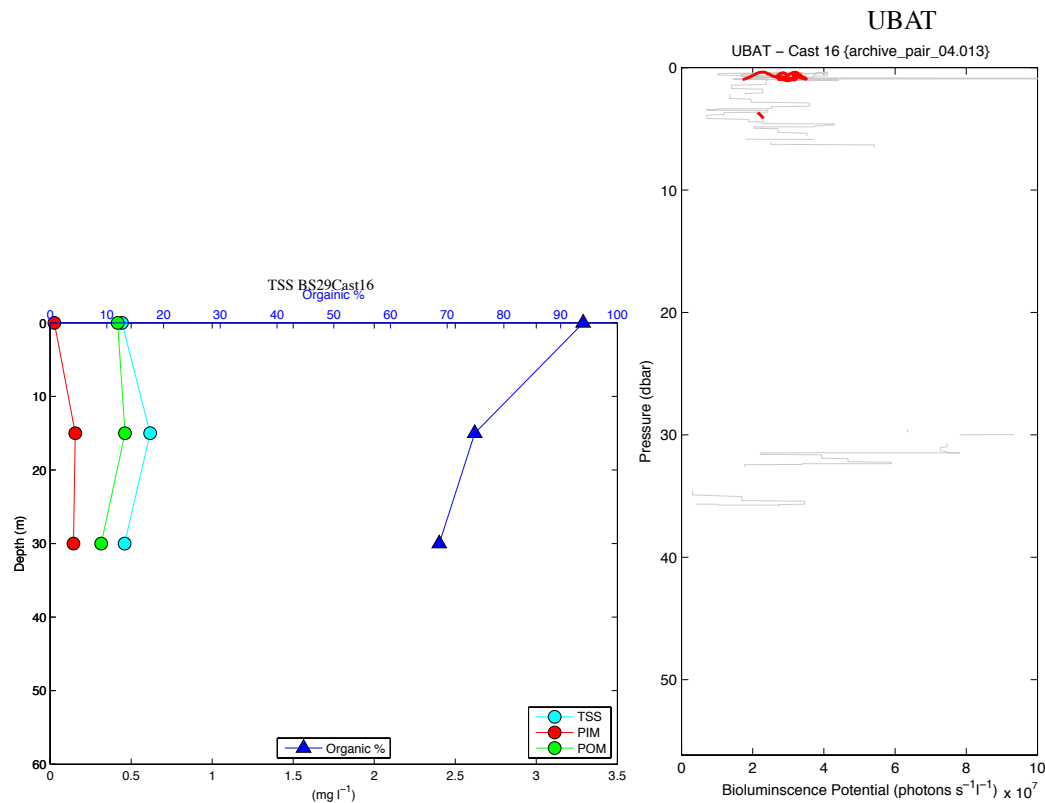
AC9 vs ASD Cast 16 – 10m (PRF2010288_13_corr.dat) CTD 11



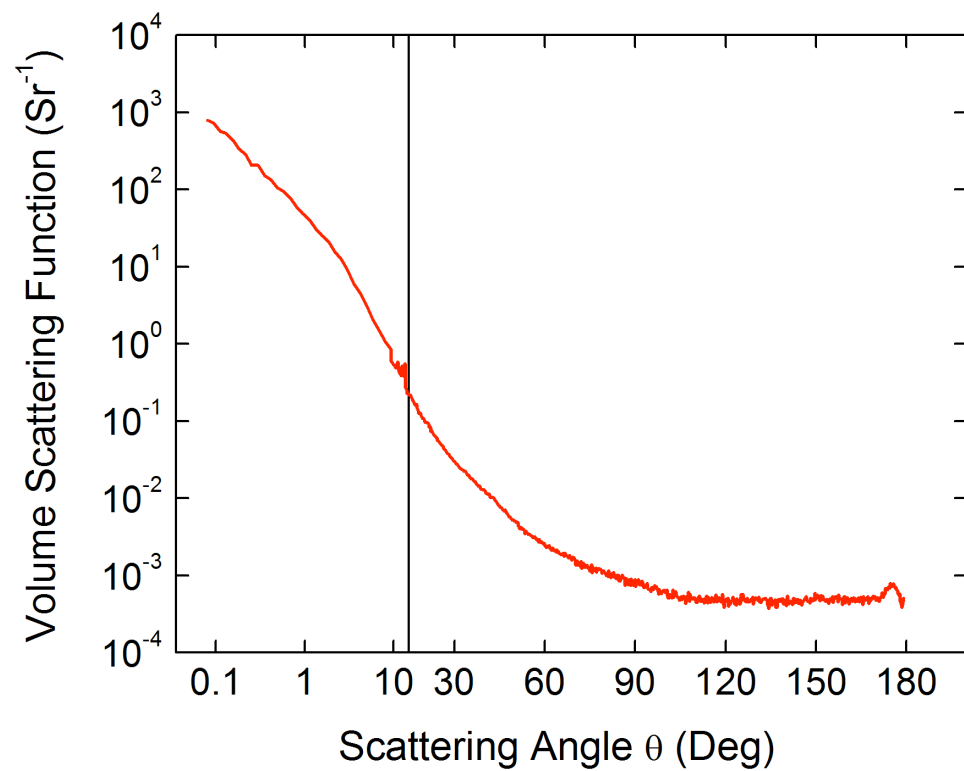
AC9 vs ASD Cast 16 – 20m (PRF2010288_13_corr.dat) CTD 11



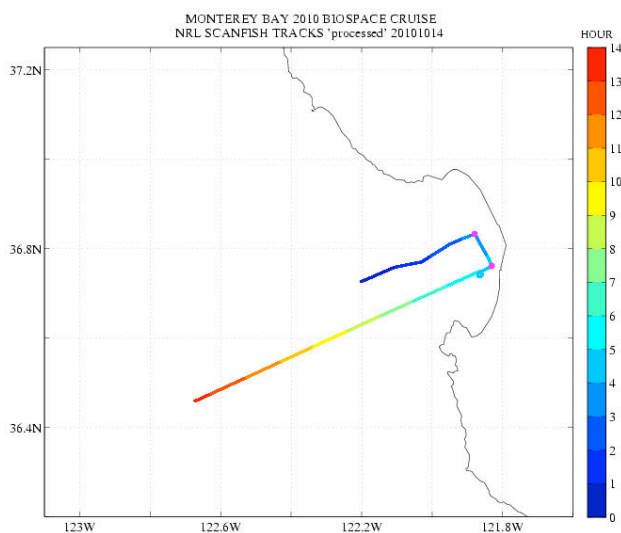
TSS



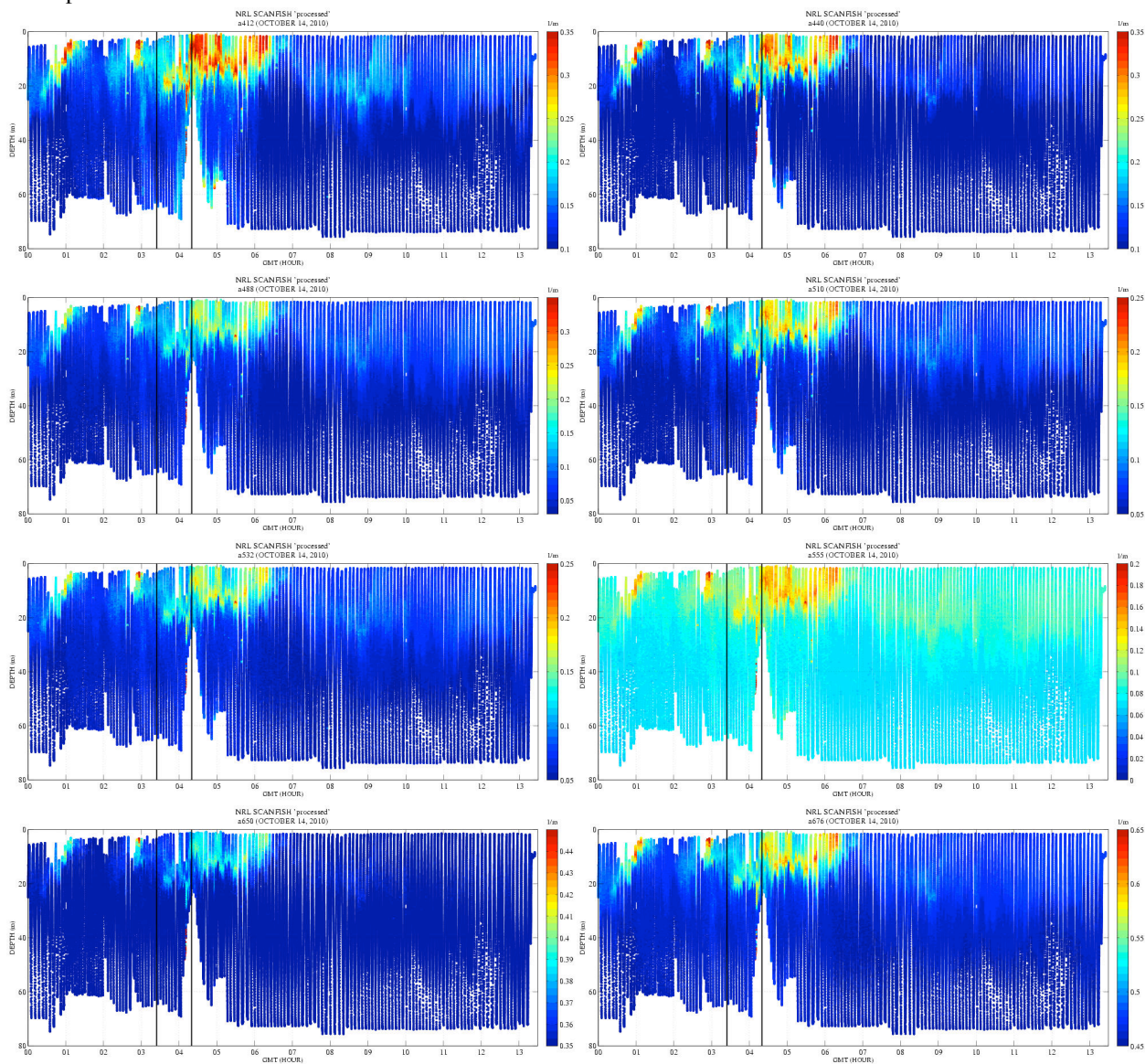
MVSC (532 nm)

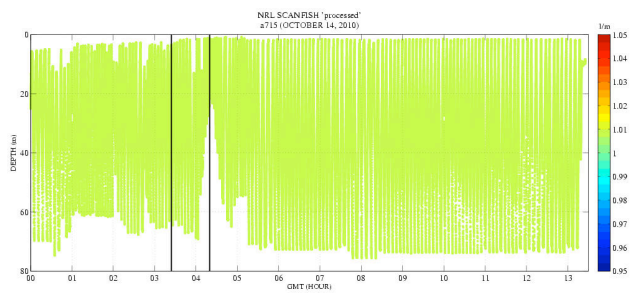


Scanfish Survey

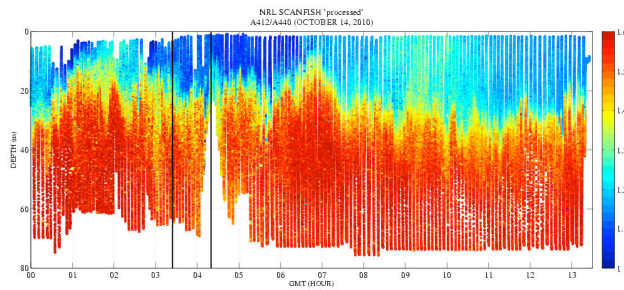


Absorption

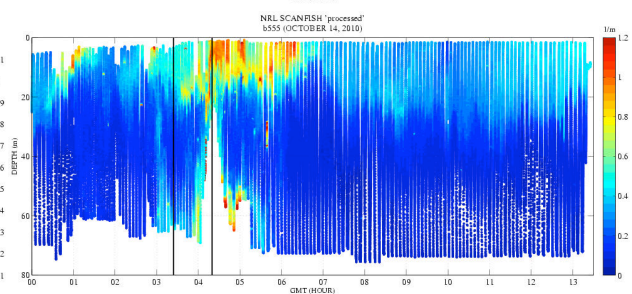
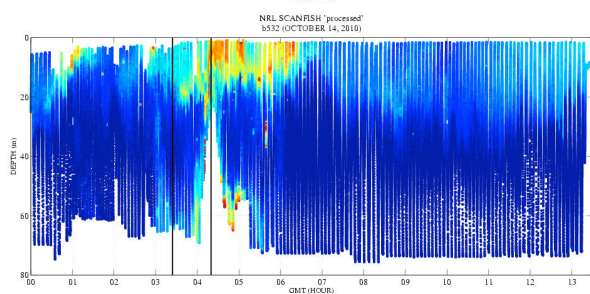
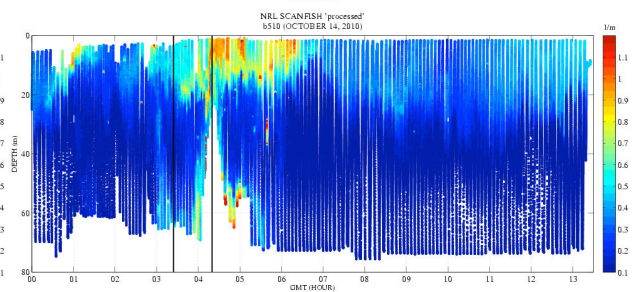
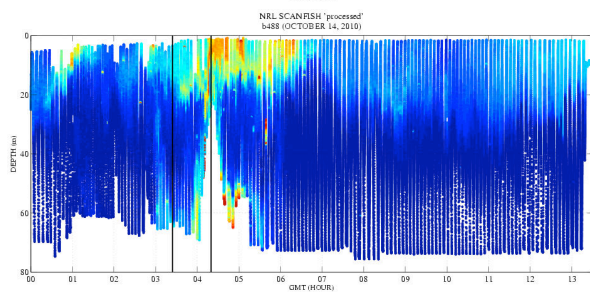
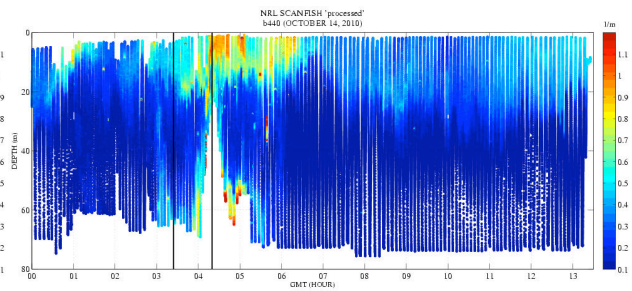
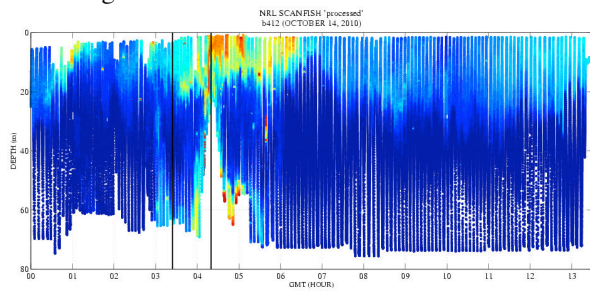


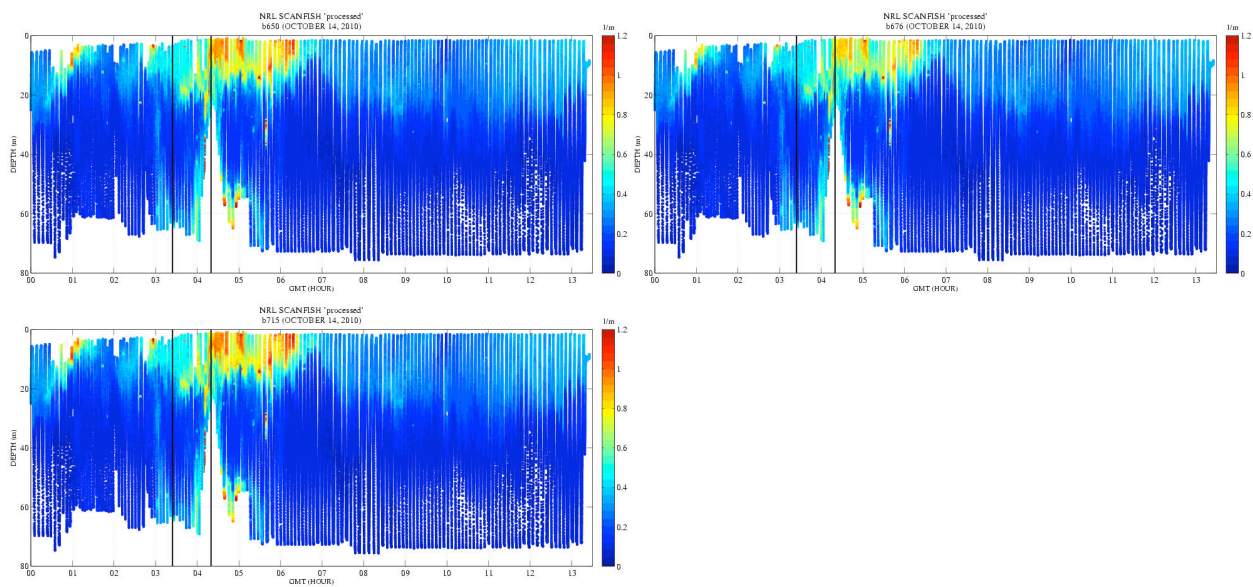


A412:A440

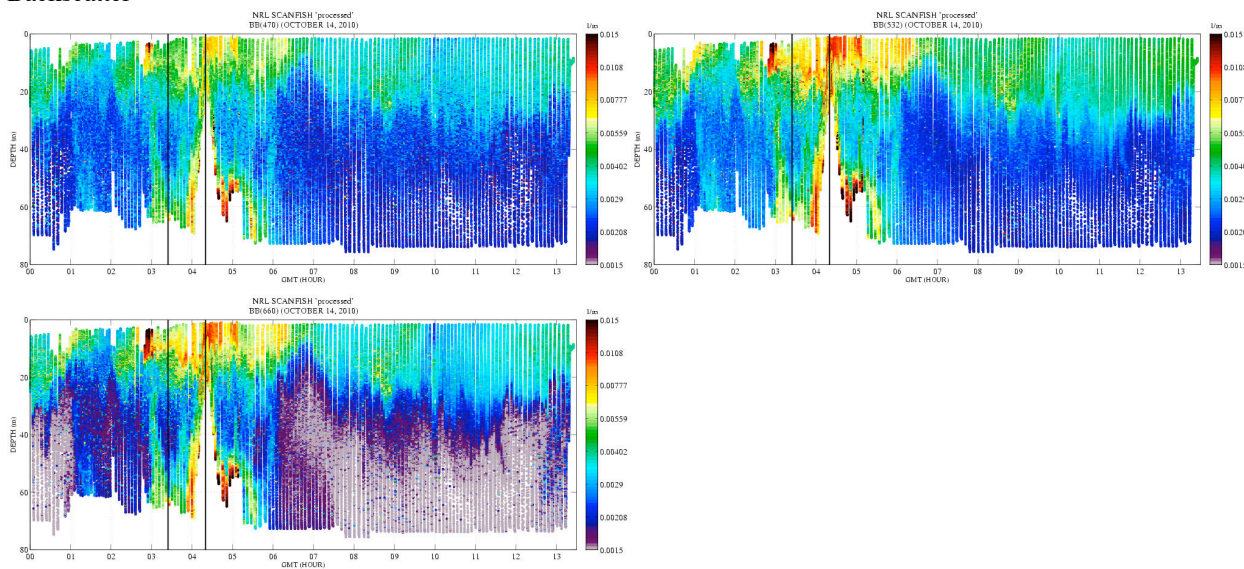


Scattering

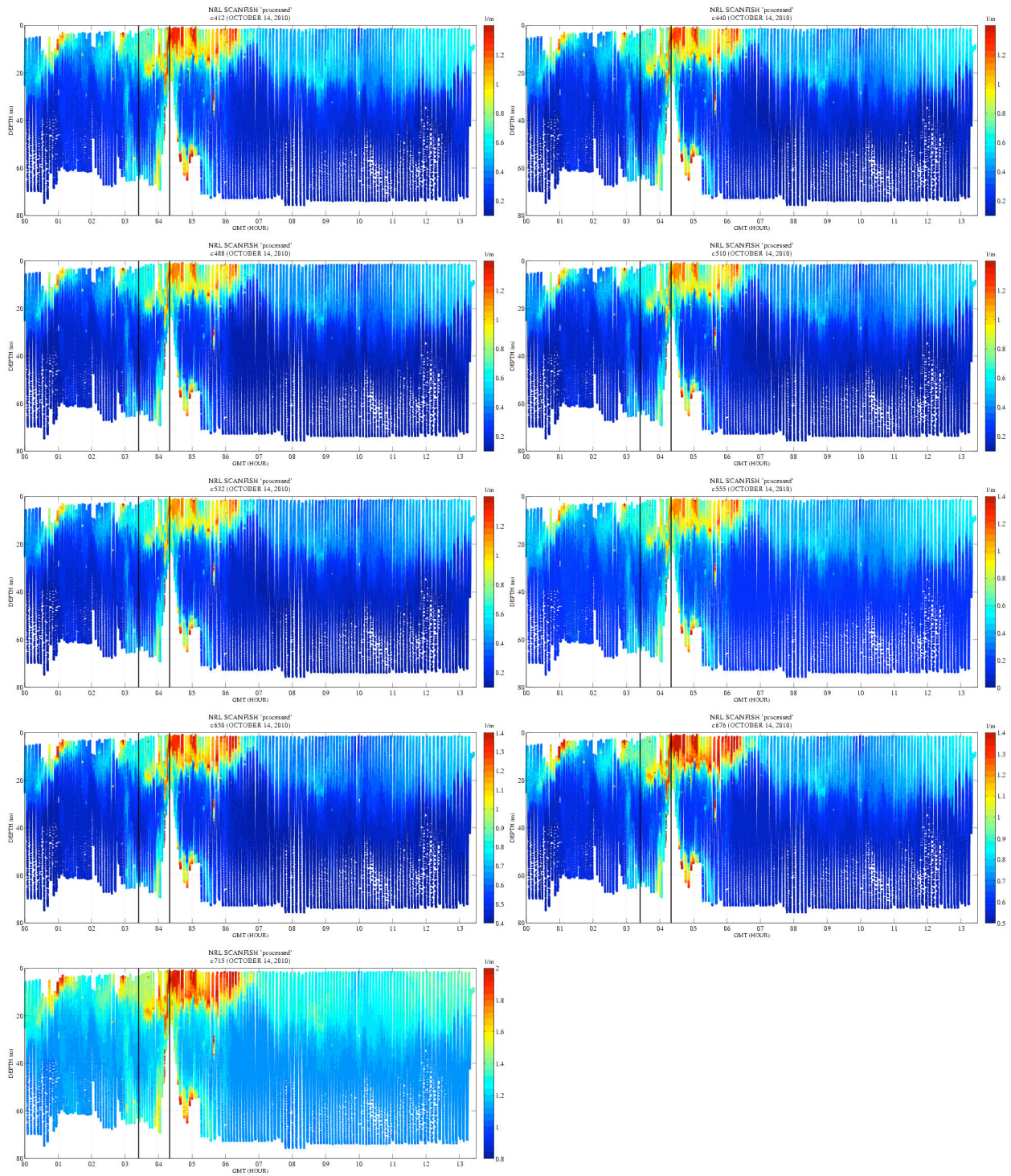




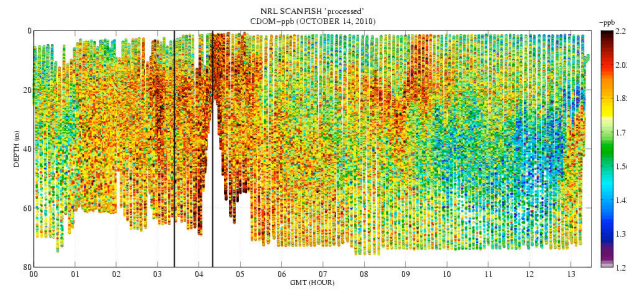
Backscatter



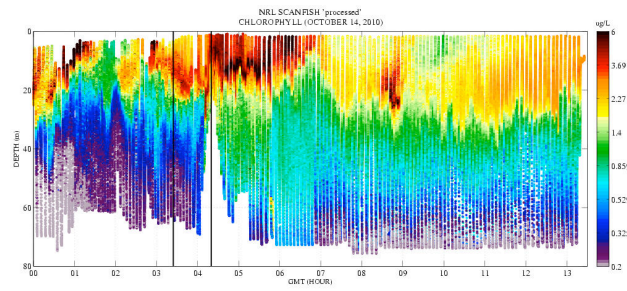
Beam Attenuation



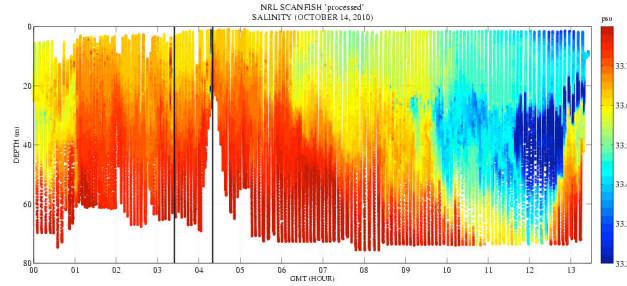
CDOM



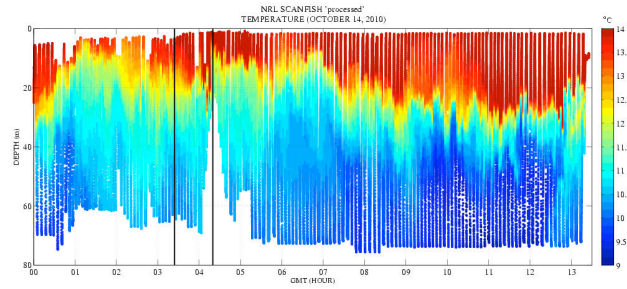
Chlorophyll



Salinity



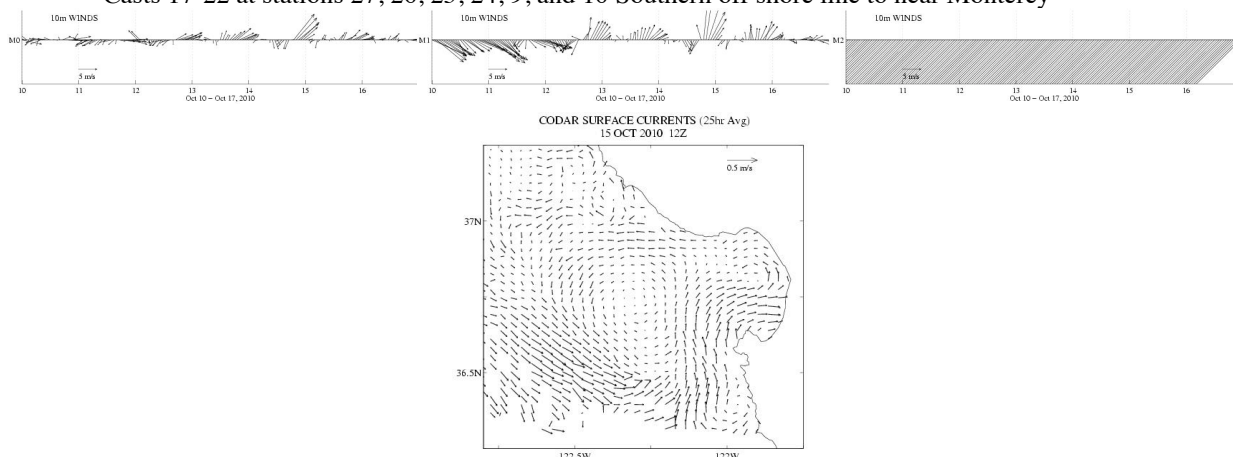
Temperature



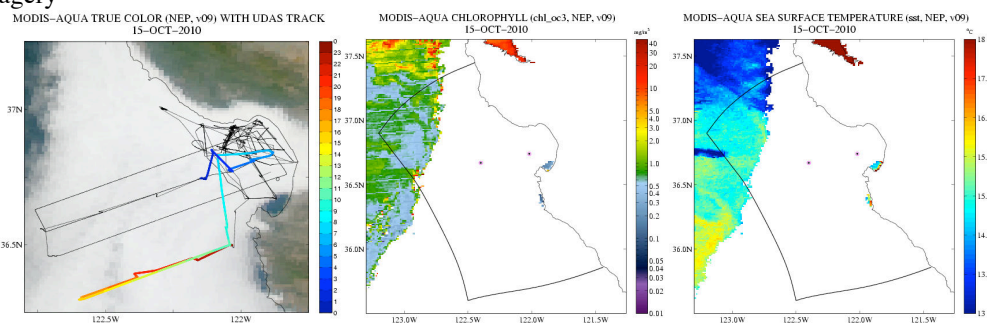
10/15

Scanfish southern offshore line overnight

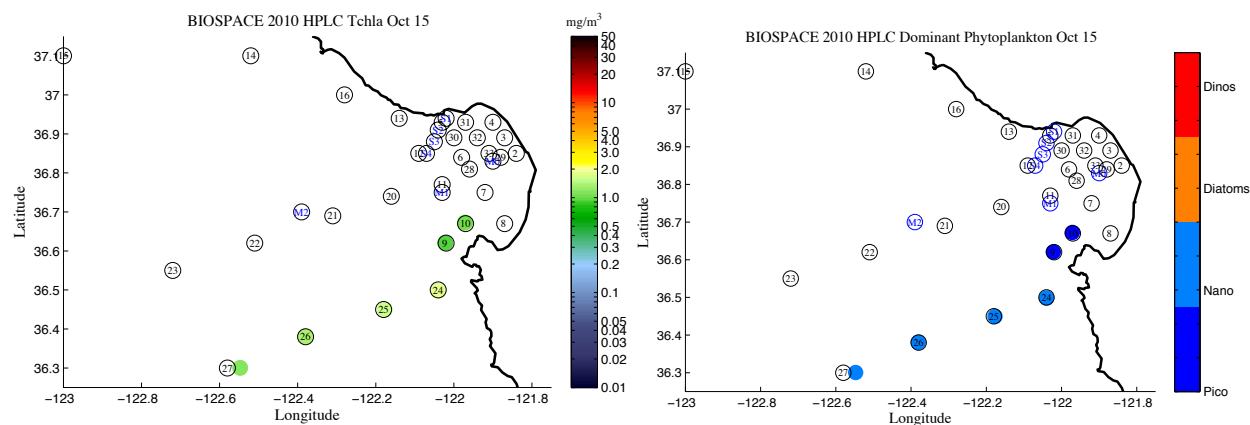
Casts 17-22 at stations 27, 26, 25, 24, 9, and 10 Southern off shore line to near Monterey



Satellite Imagery



HPLC



Aircraft Flight-lines

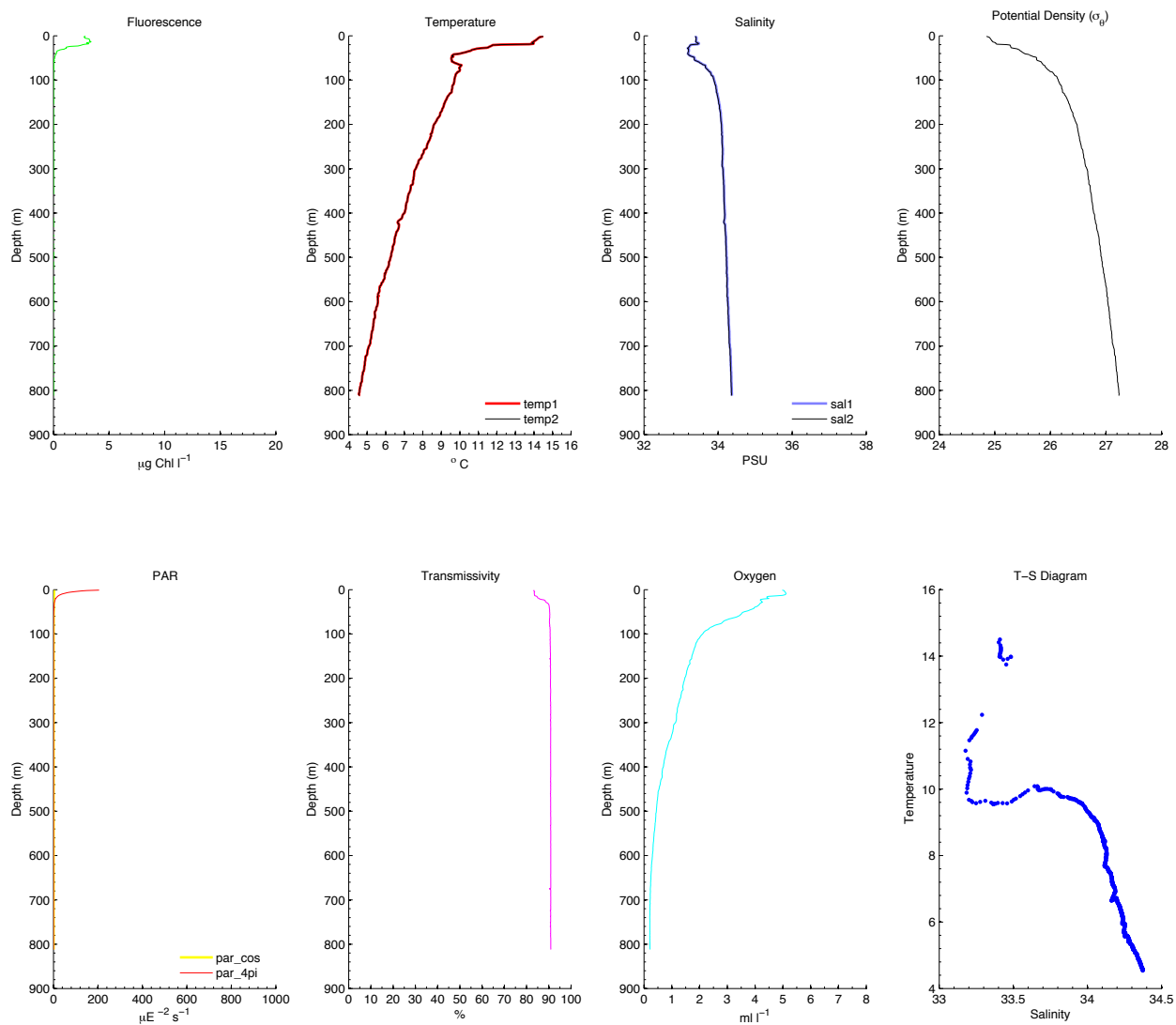


PHILLS Caption: Marine layer heavy over most of Bay and outside Bay. At time of flight a clear opening near Monterey opened up. We decided to do a few short runs over the clear (cloud free) water using the stage "tracking" mode. In this mode the stage (and PHILLS) is pitched forward 35 degrees and microShine 65 degrees. At points along the run, tracking was initiated and the stage followed the point on the ground it was pointed to at the time of track initiation. This effectively changes the pitch of the stage from +35 to -30 degrees (the stage limit) when tracking is stopped, and the stage pitched forward +35 degrees to begin another tracking. The cloud free area wasn't very large and about two tracking events were accomplished during each run. The data runs were always taken with the plane moving from South to North (opposite the Sun) in order to eliminate glint.

Cast 17 (0910 PDT; [Station BS27](#))
(foggy)

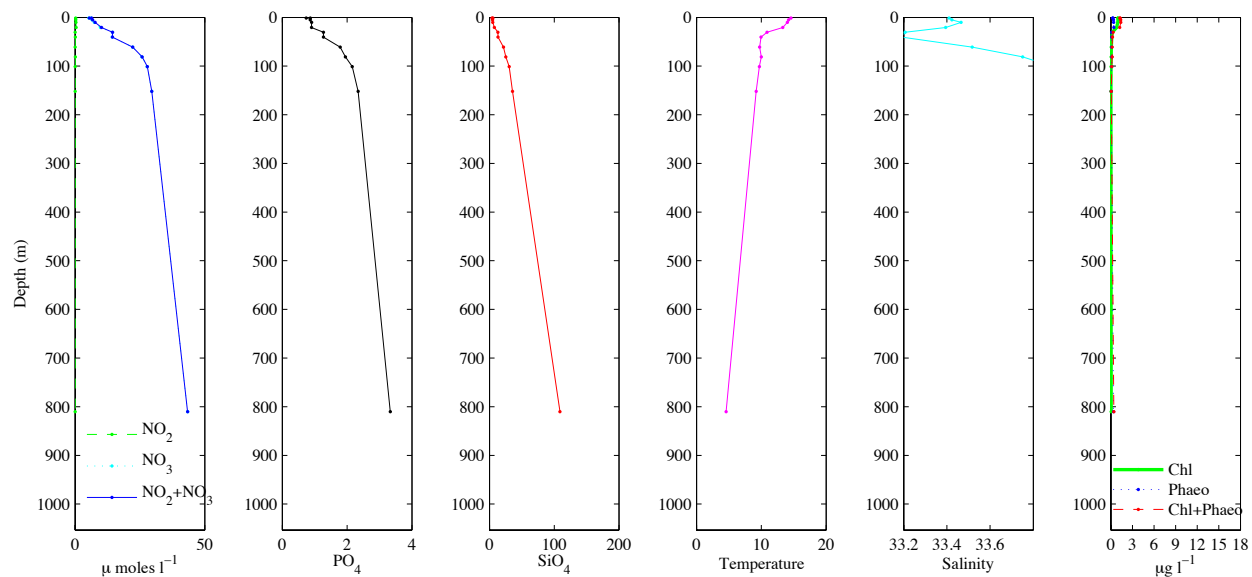
CTD

BIOSPACE 2010 Cast 17 (CTD27; 2010-10-15 16:15:00.000 UTC) CTD Downcast Data (Calibrated)



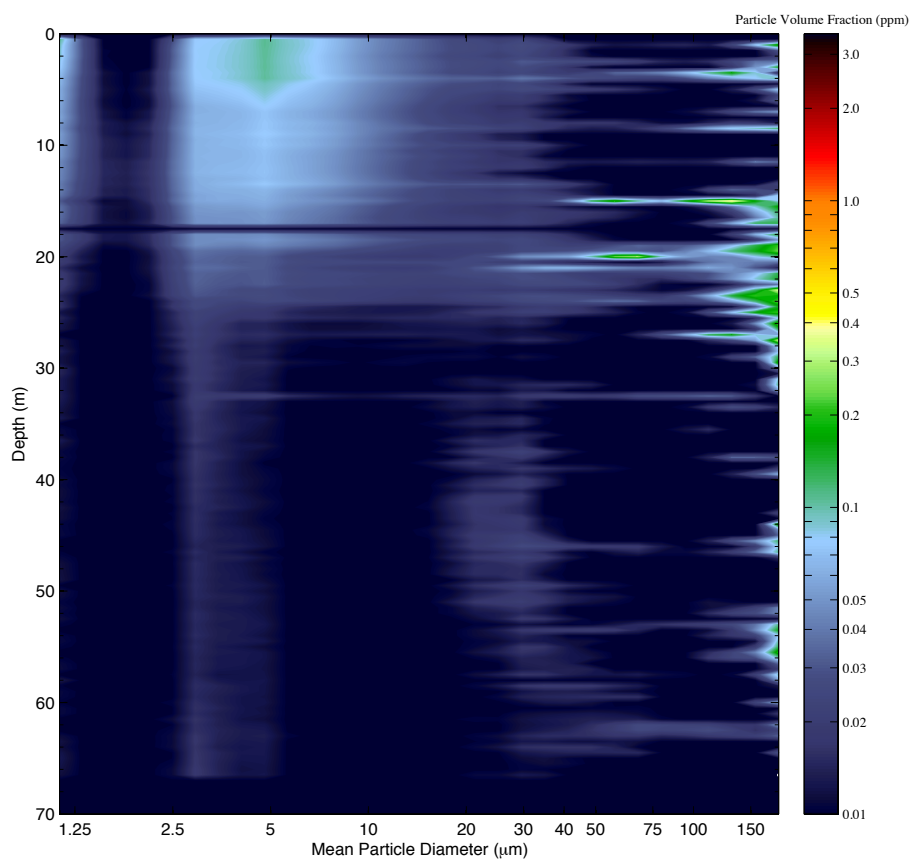
Bottle Nutrients and Chlorophyll

BIOSPACE 2010 Cast 17

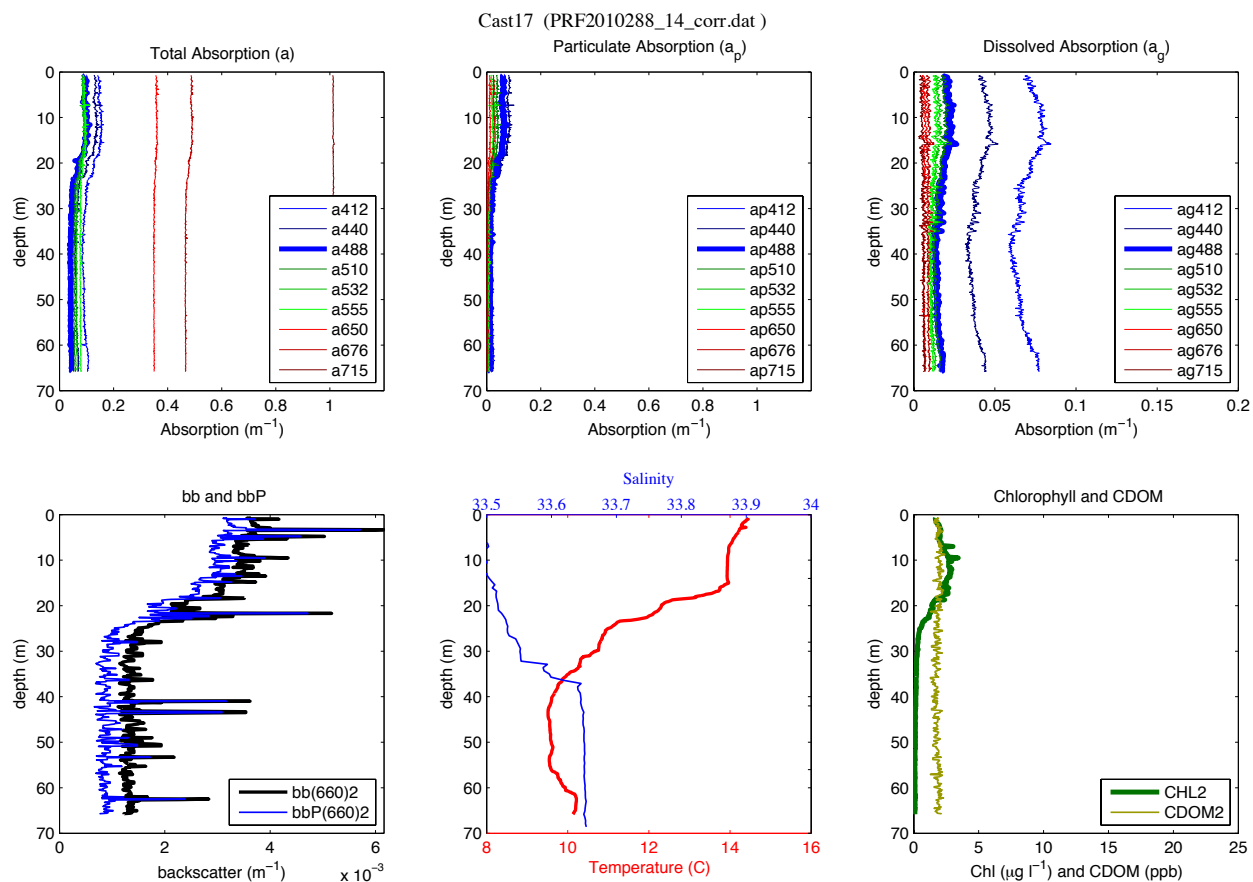


LISST

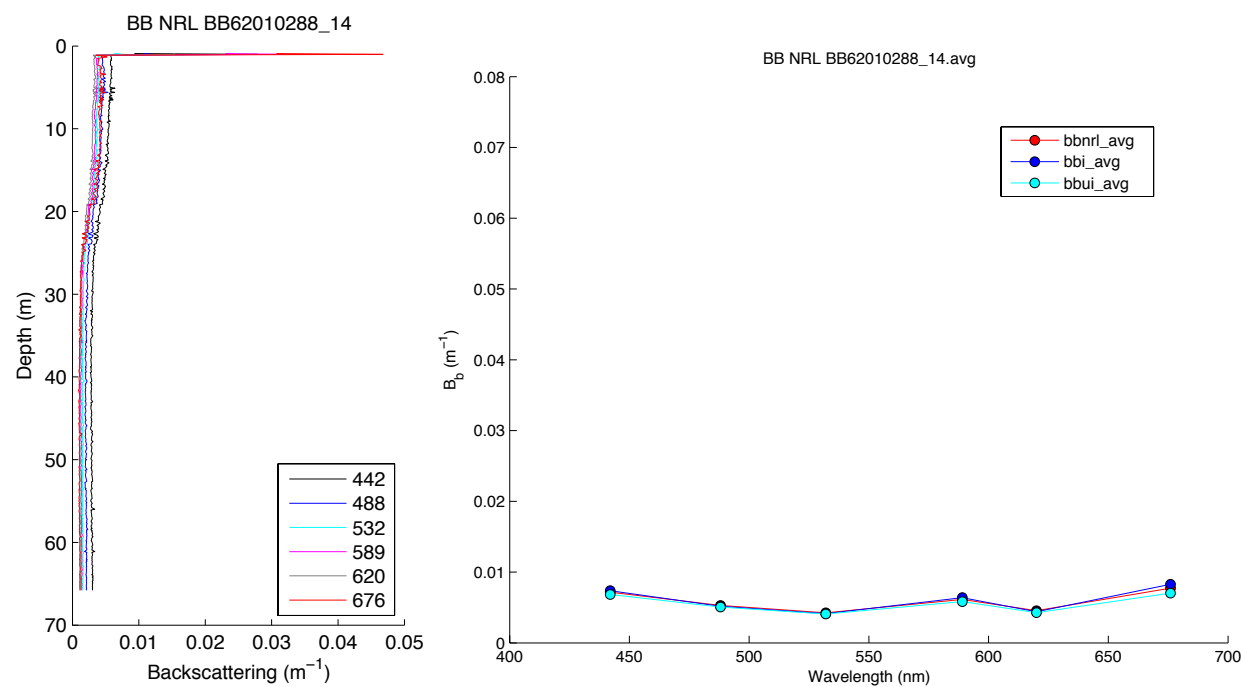
LISST – Cast 17



Optics Profile Package

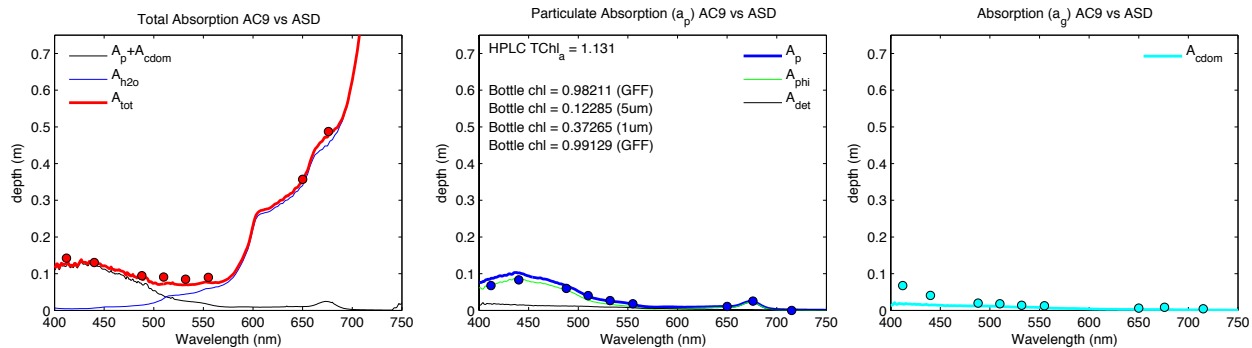


HydroScat

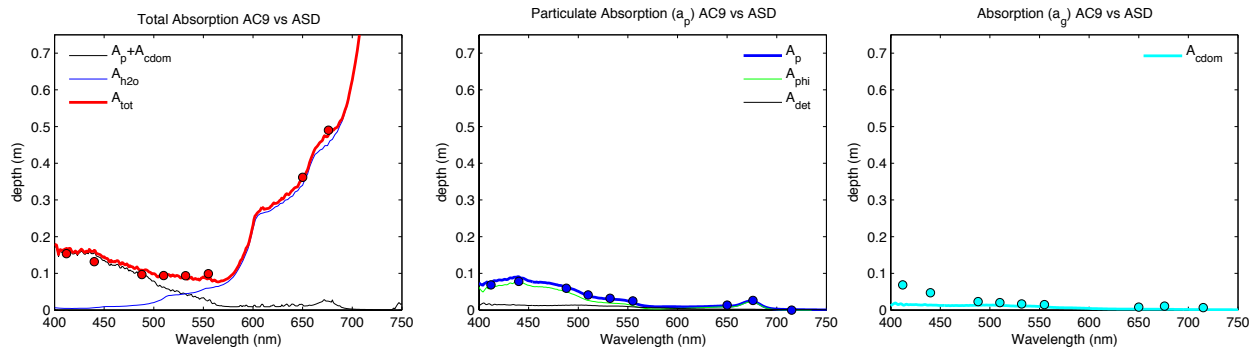


Filter Pad Absorption (w/ AC9)

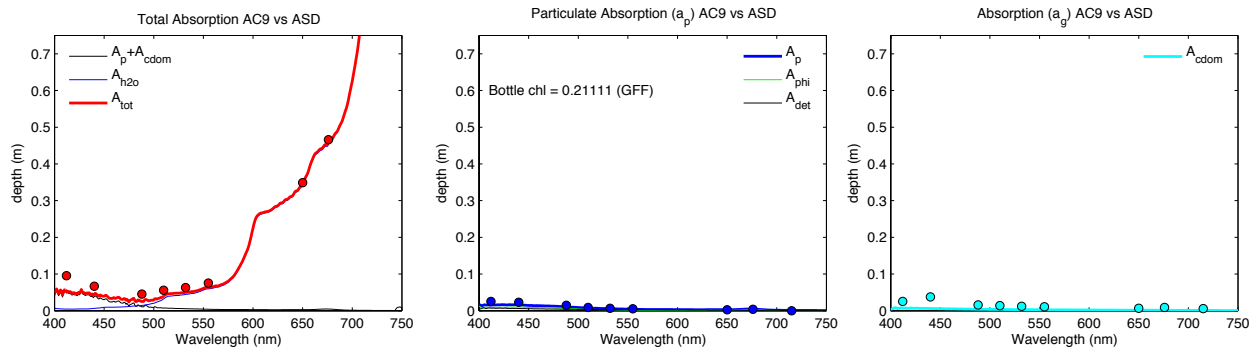
AC9 vs ASD Cast 17 – 0m (PRF2010288_14_corr.dat) CTD 28



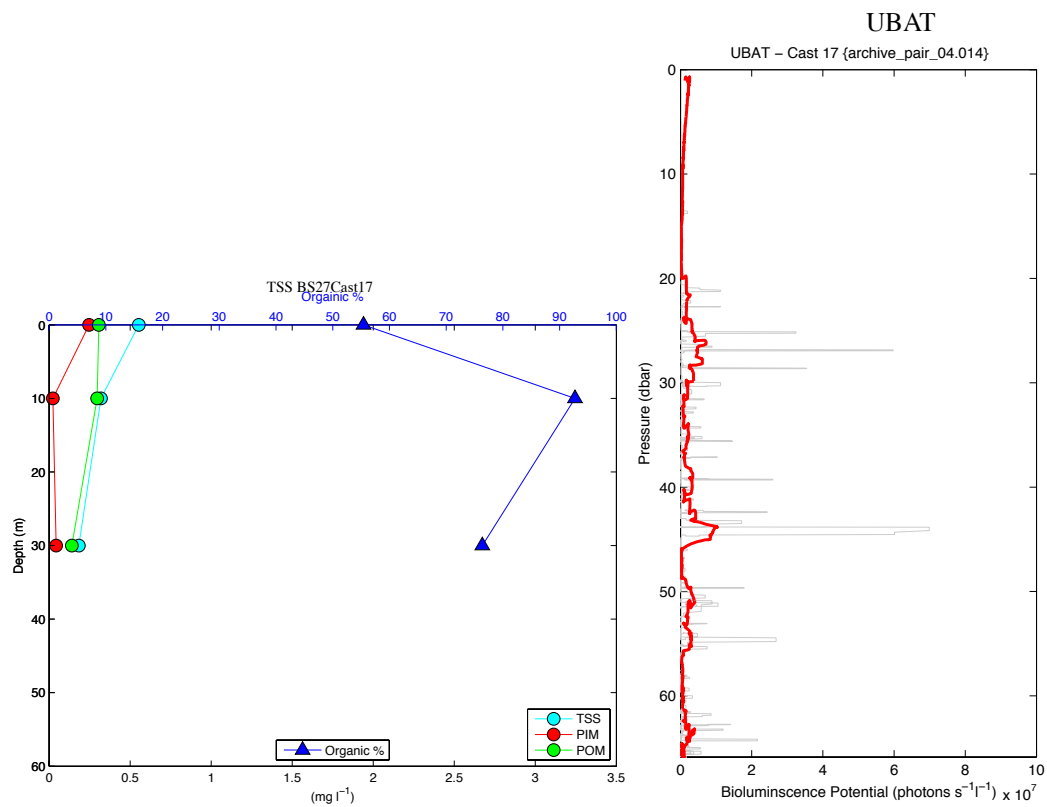
AC9 vs ASD Cast 17 – 15m (PRF2010288_14_corr.dat) CTD 28



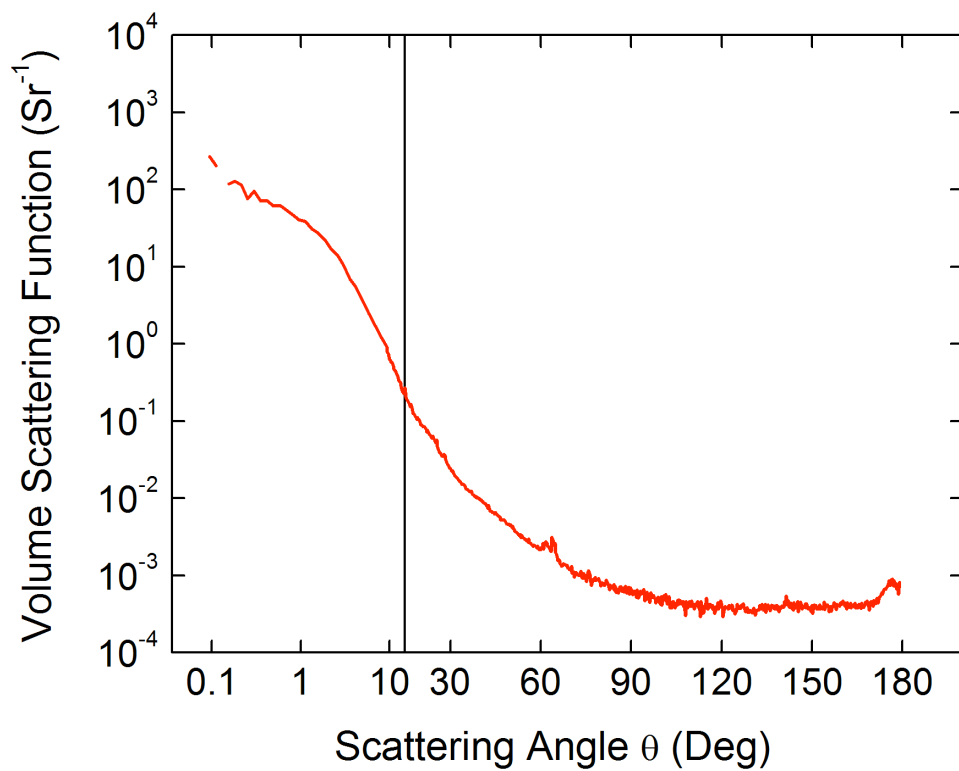
AC9 vs ASD Cast 17 – 30m (PRF2010288_14_corr.dat) CTD 28



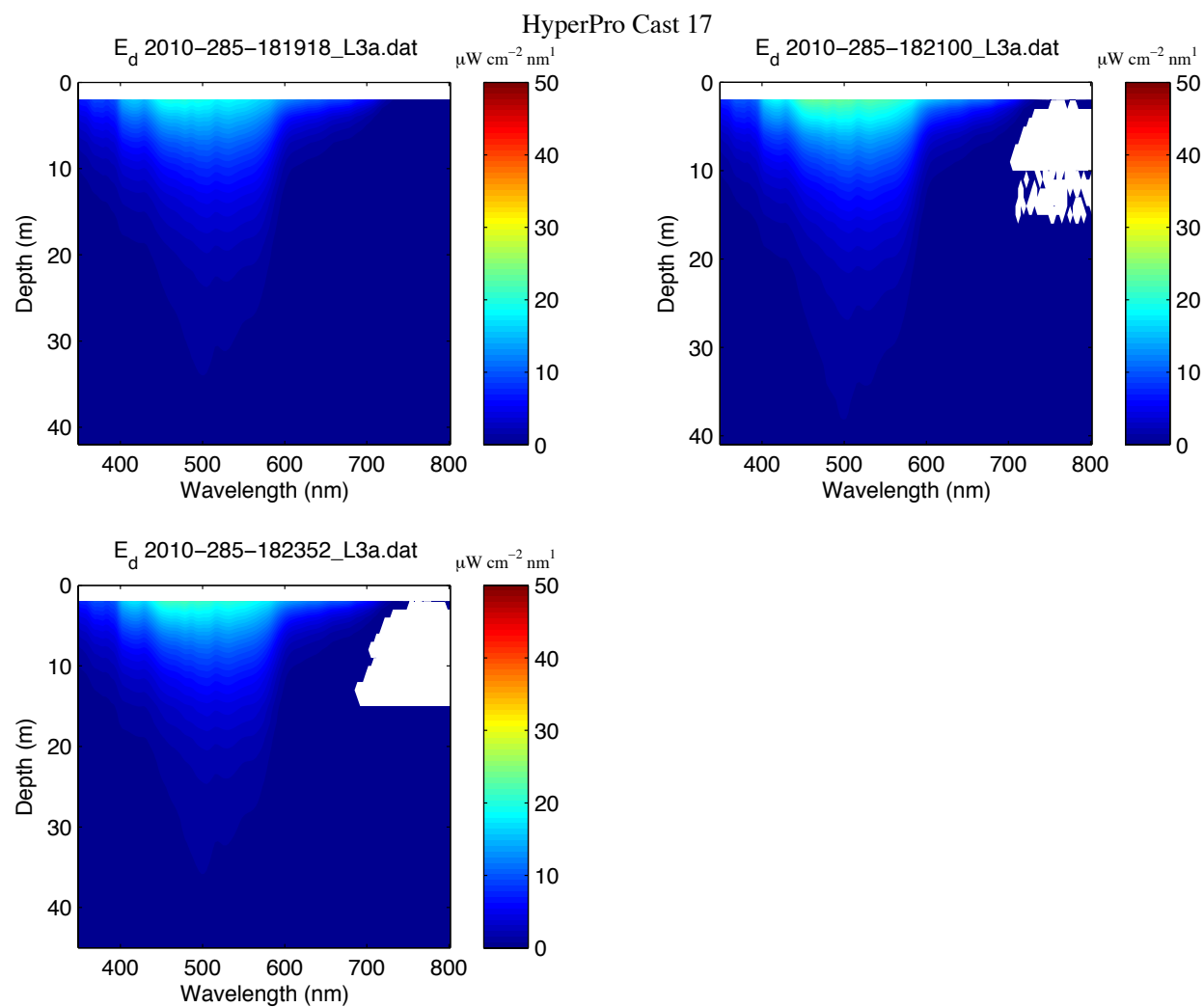
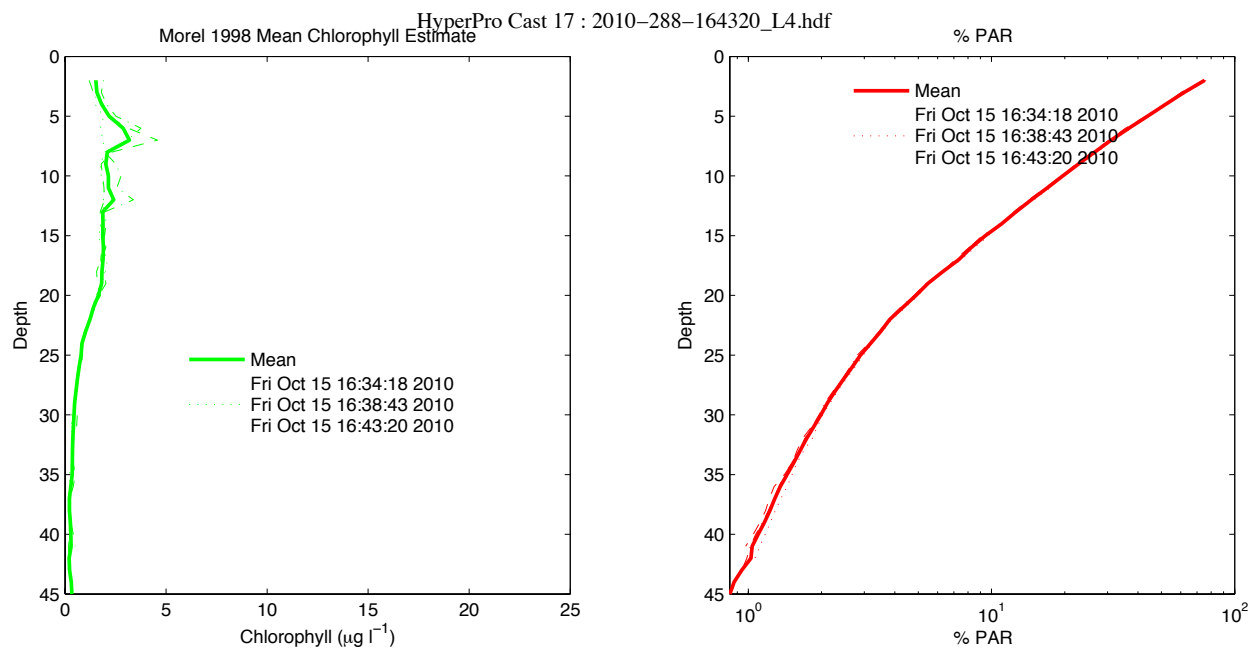
TSS



MVSC (532 nm)



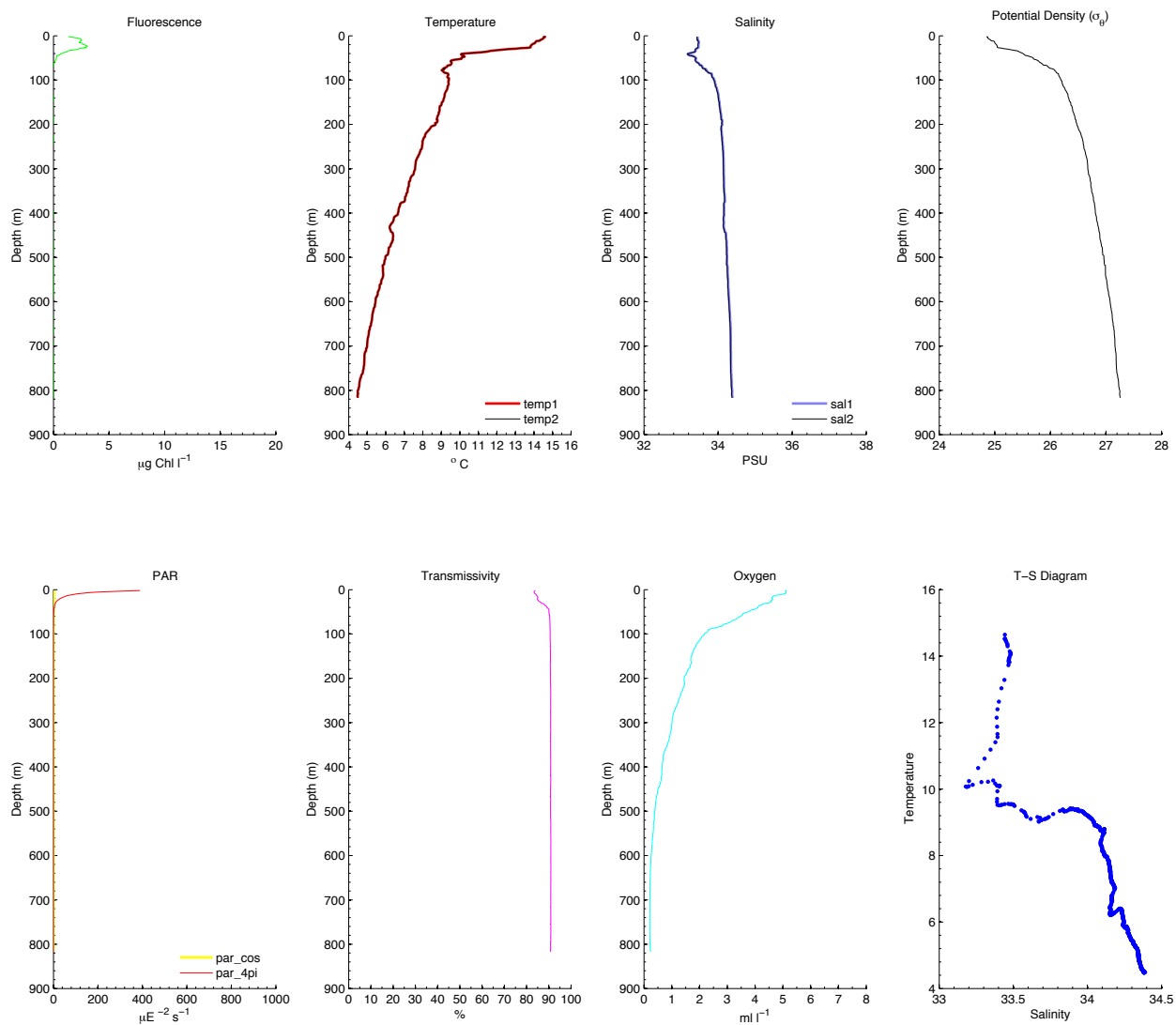
HyperPro



Cast 18 (1154 PDT; [Station BS26](#))
(overcast)

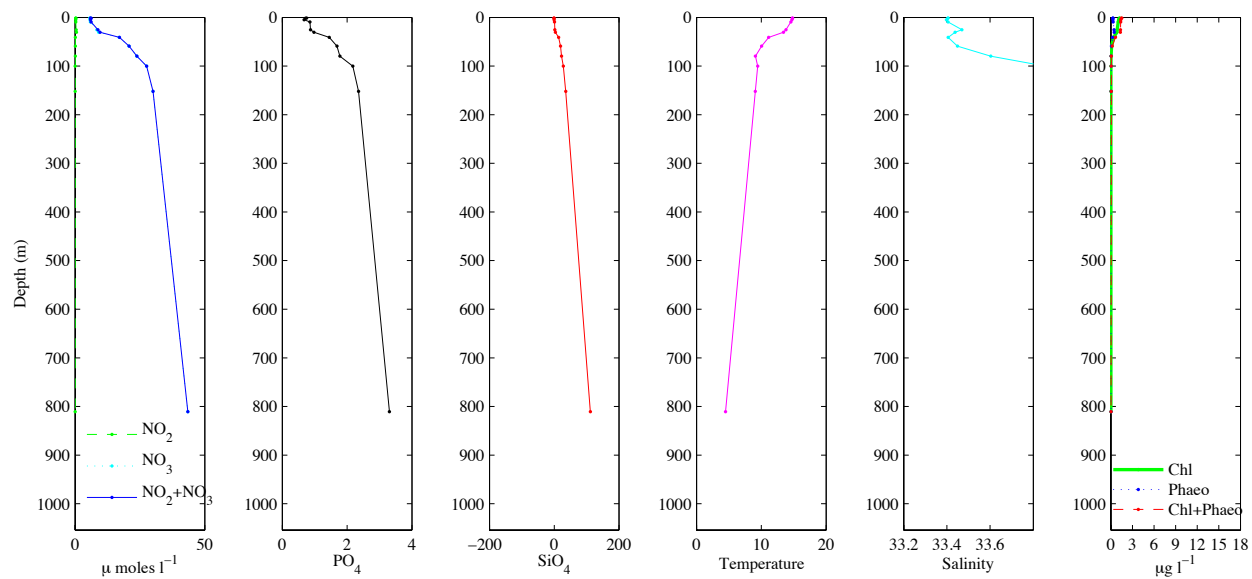
CTD

BIOSPACE 2010 Cast 18 (CTD26; 2010-10-15 18:59:00.000 UTC) CTD Downcast Data (Calibrated)



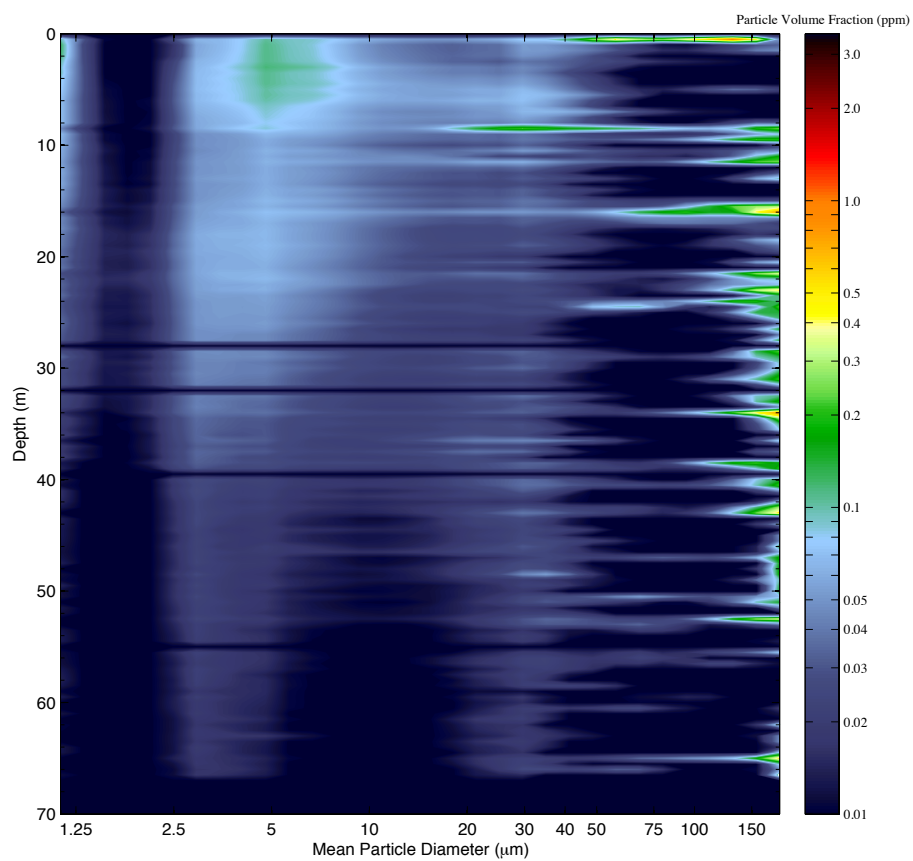
Bottle Nutrients and Chlorophyll

BIOSPACE 2010 Cast 18

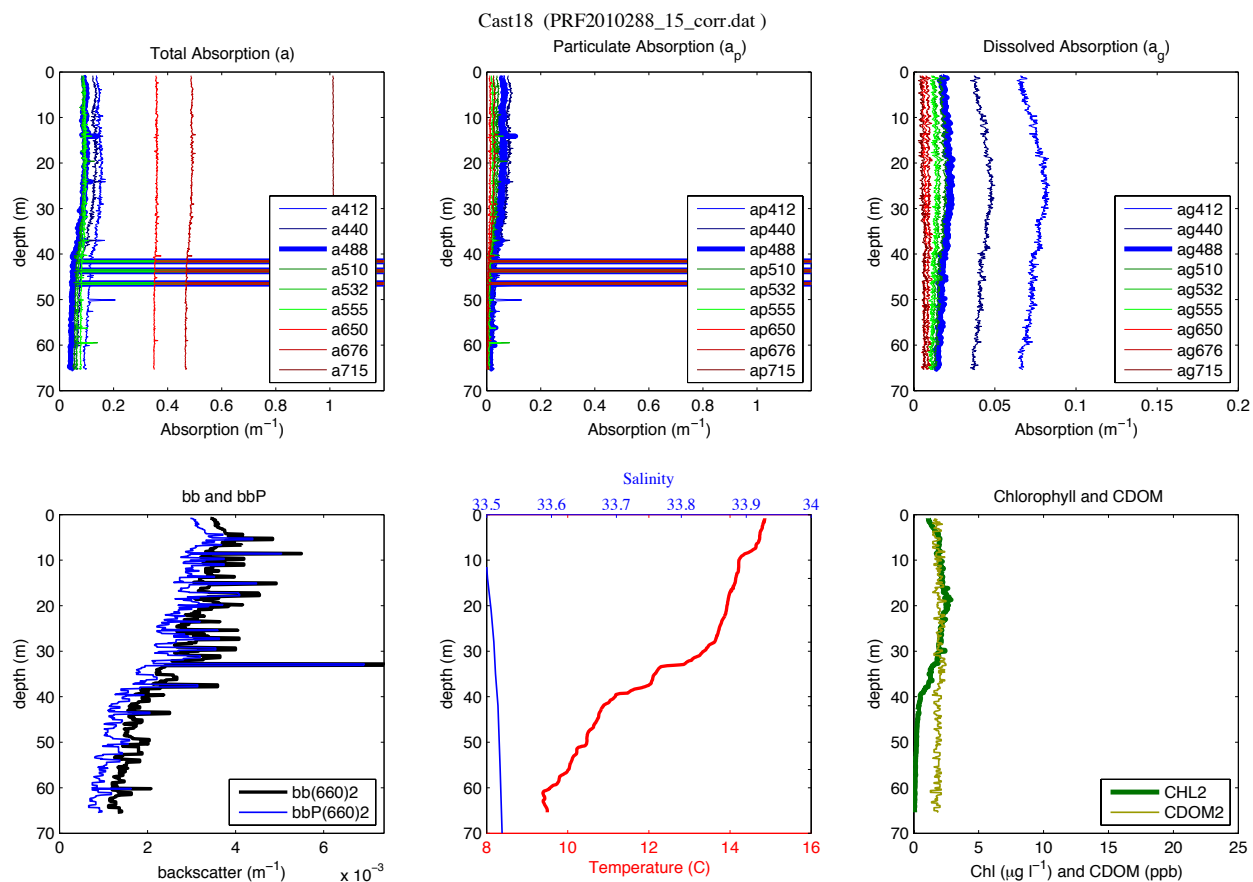


LISST

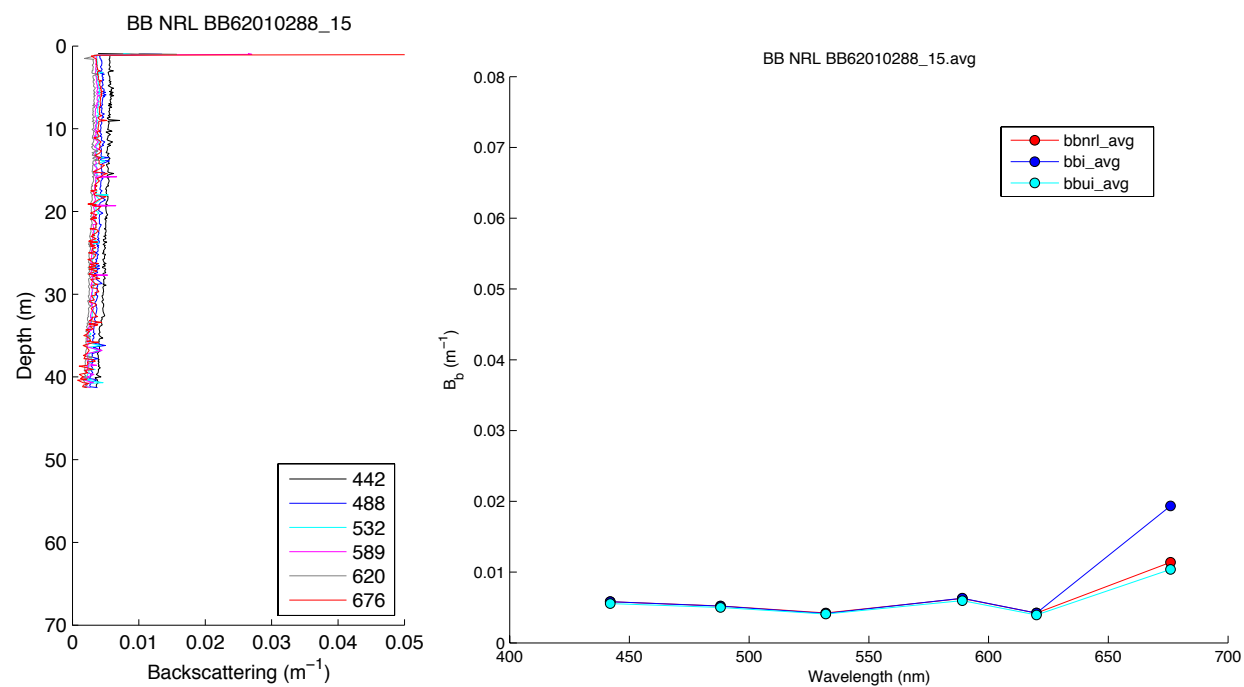
LISST – Cast 18



Optics Profile Package

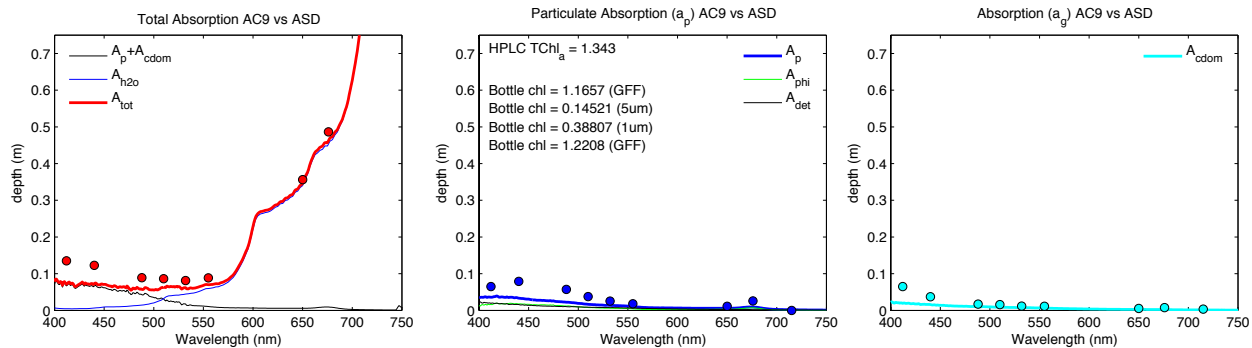


HydroScat

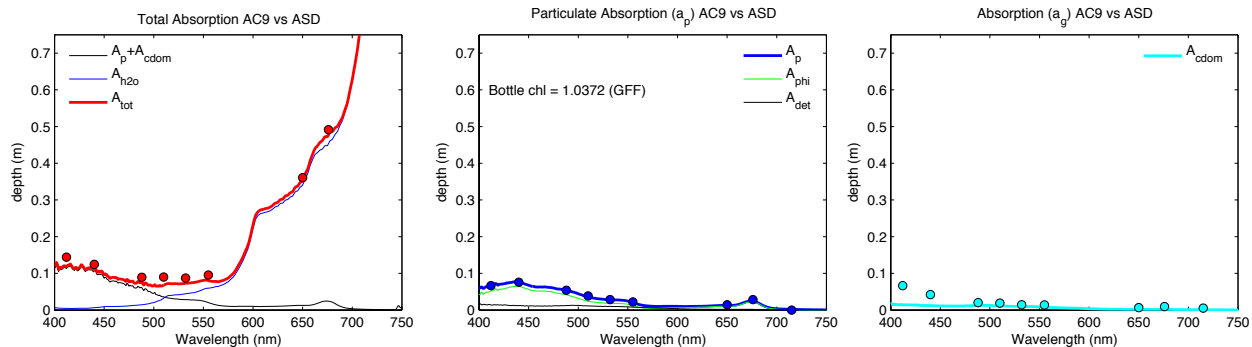


Filter Pad Absorption (w/ AC9)

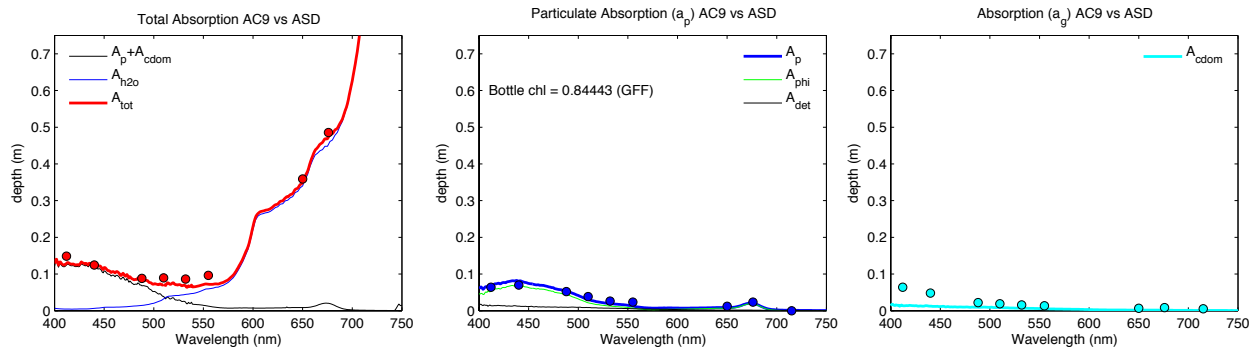
AC9 vs ASD Cast 18 – 0m (PRF2010288_15_corr.dat) CTD 29



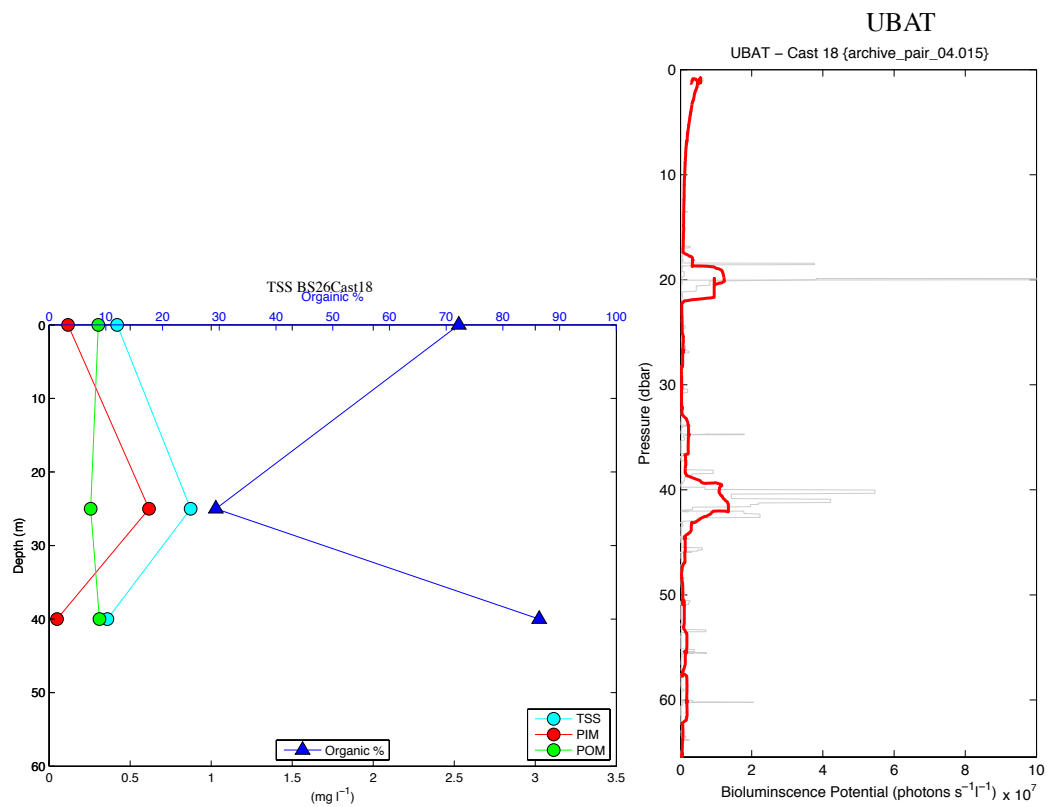
AC9 vs ASD Cast 18 – 10m (PRF2010288_15_corr.dat) CTD 29



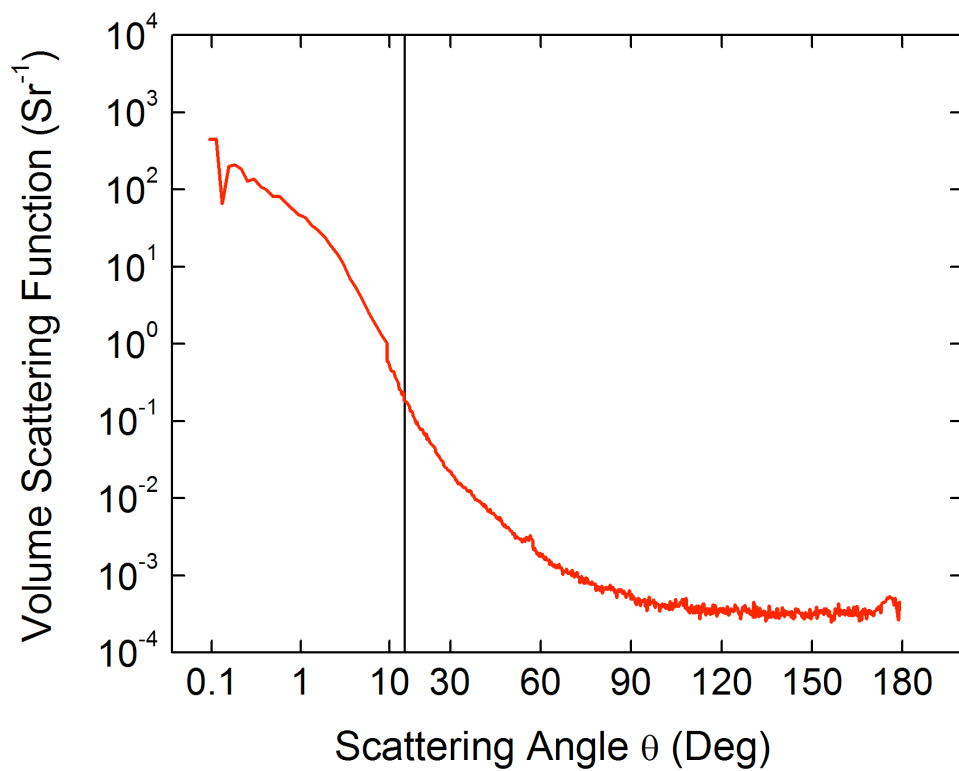
AC9 vs ASD Cast 18 – 30m (PRF2010288_15_corr.dat) CTD 29



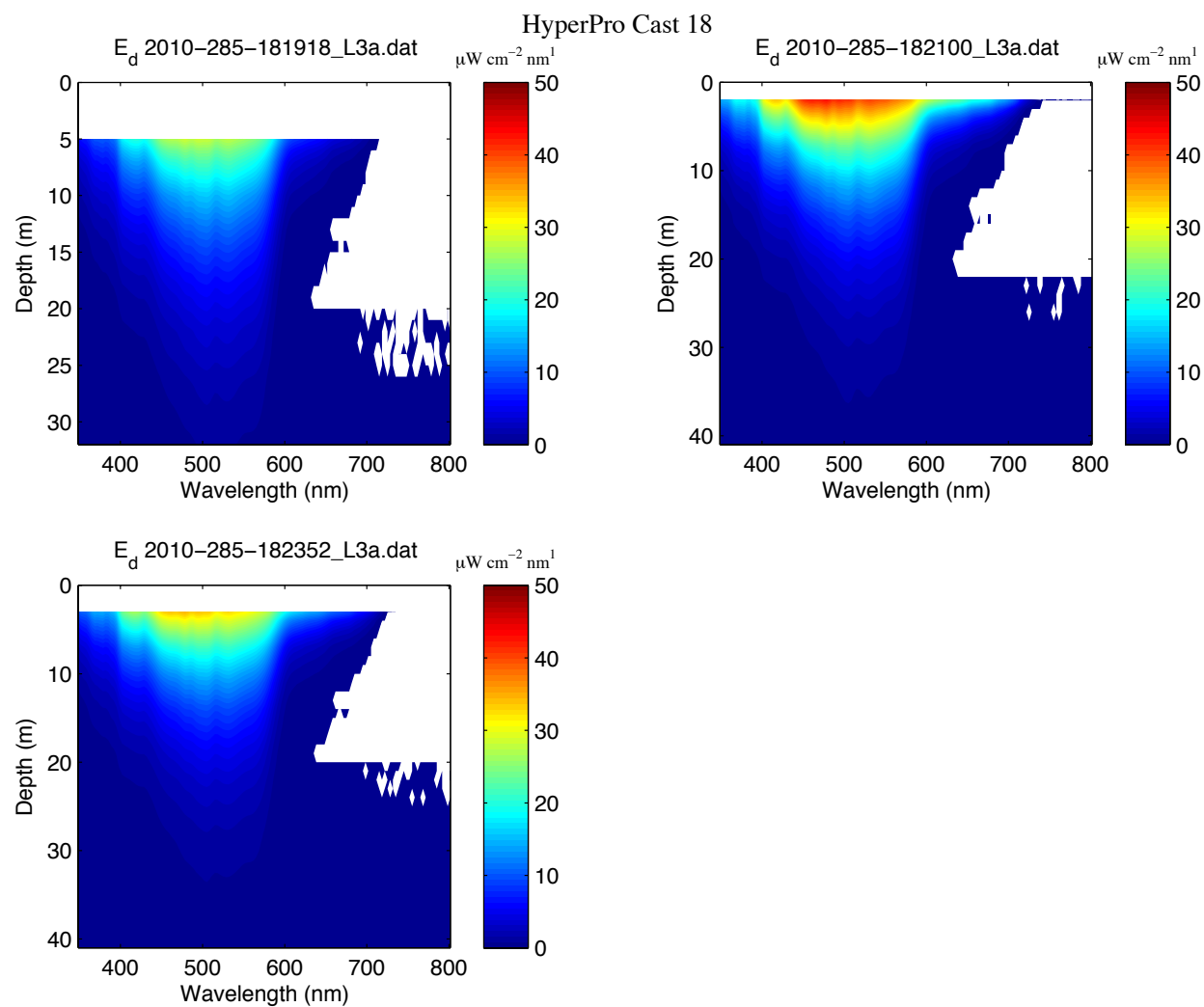
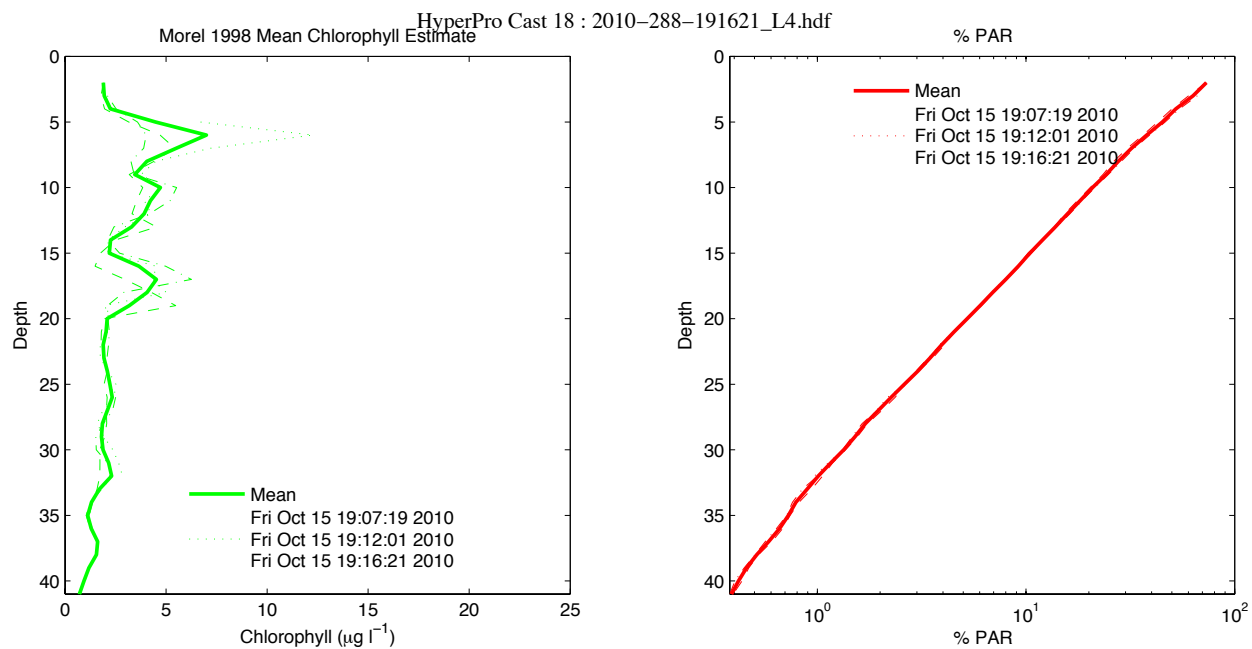
TSS



MVSC (532 nm)



HyperPro

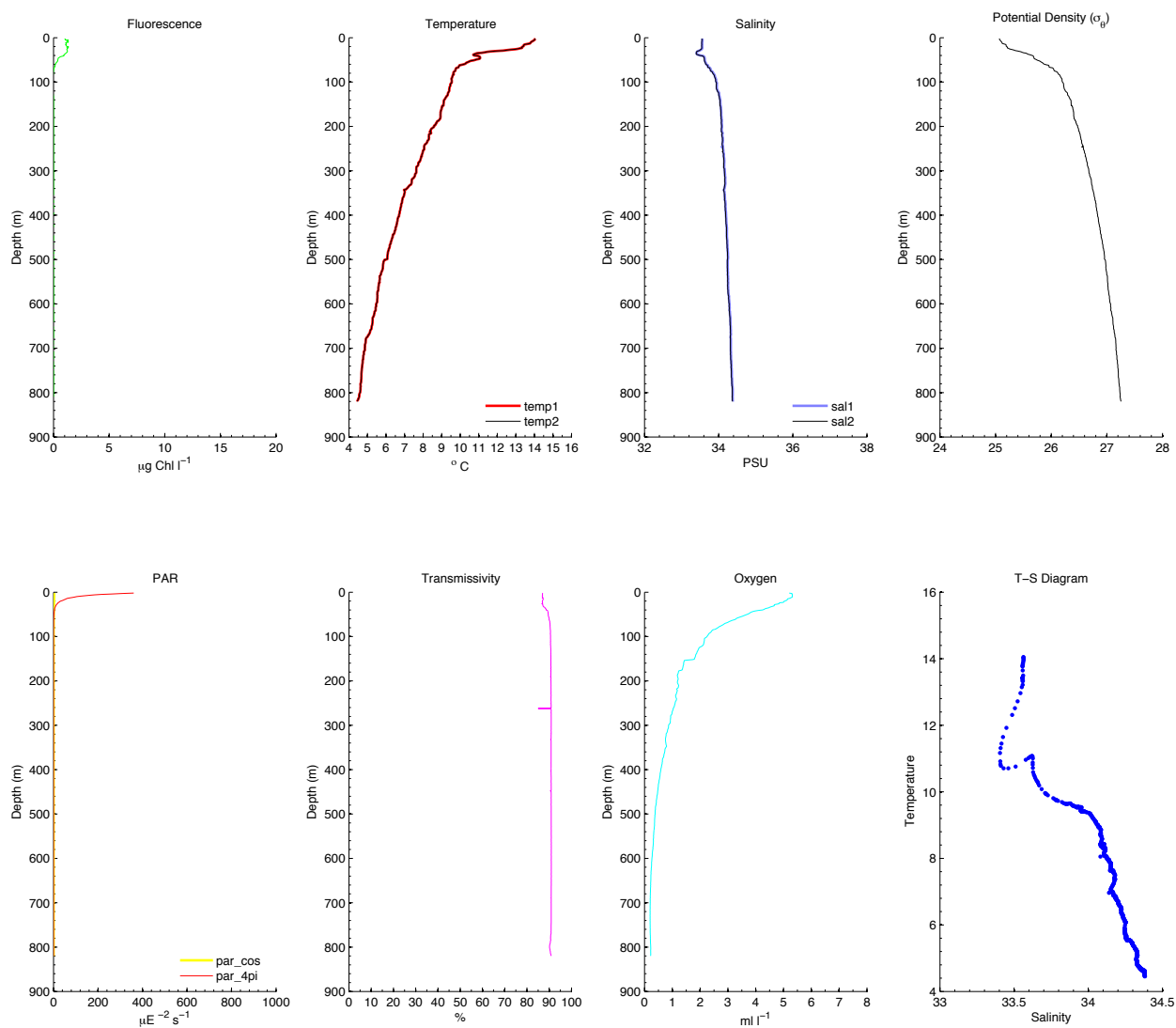


Cast 19 (1428 PDT; [Station BS25](#))

(Two subsurface peaks in fluor. Took samples at surface and each peak) (overcast)

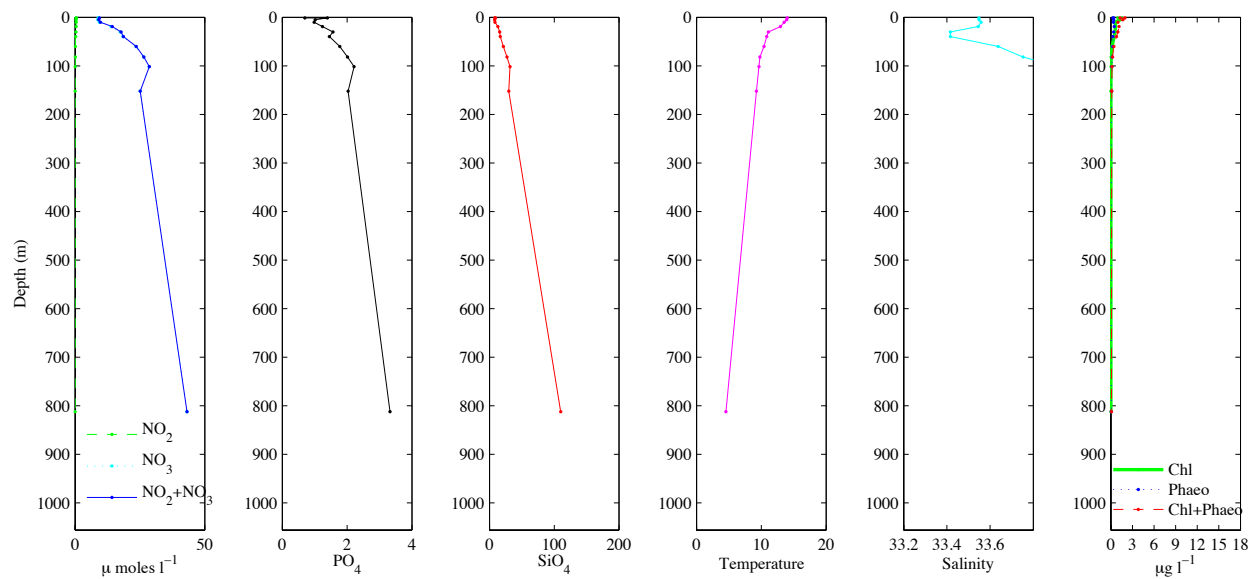
CTD

BIOSPACE 2010 Cast 19 (CTD25; 2010-10-15 21:28:00.000 UTC) CTD Downcast Data (Calibrated)



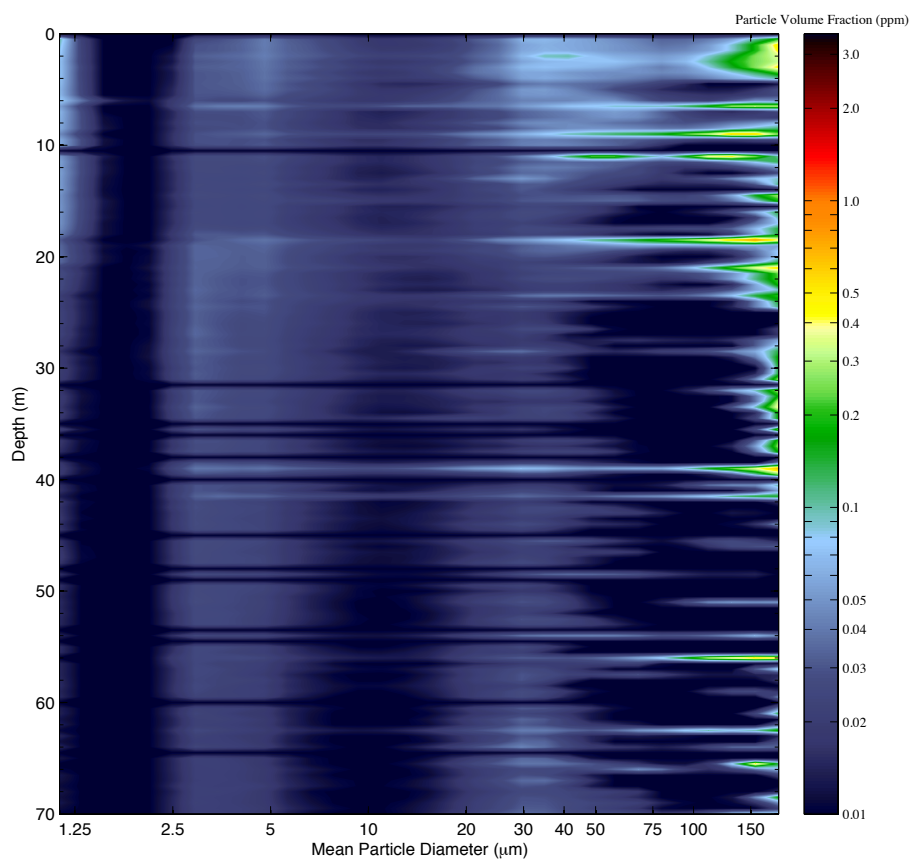
Bottle Nutrients and Chlorophyll

BIOSPACE 2010 Cast 19

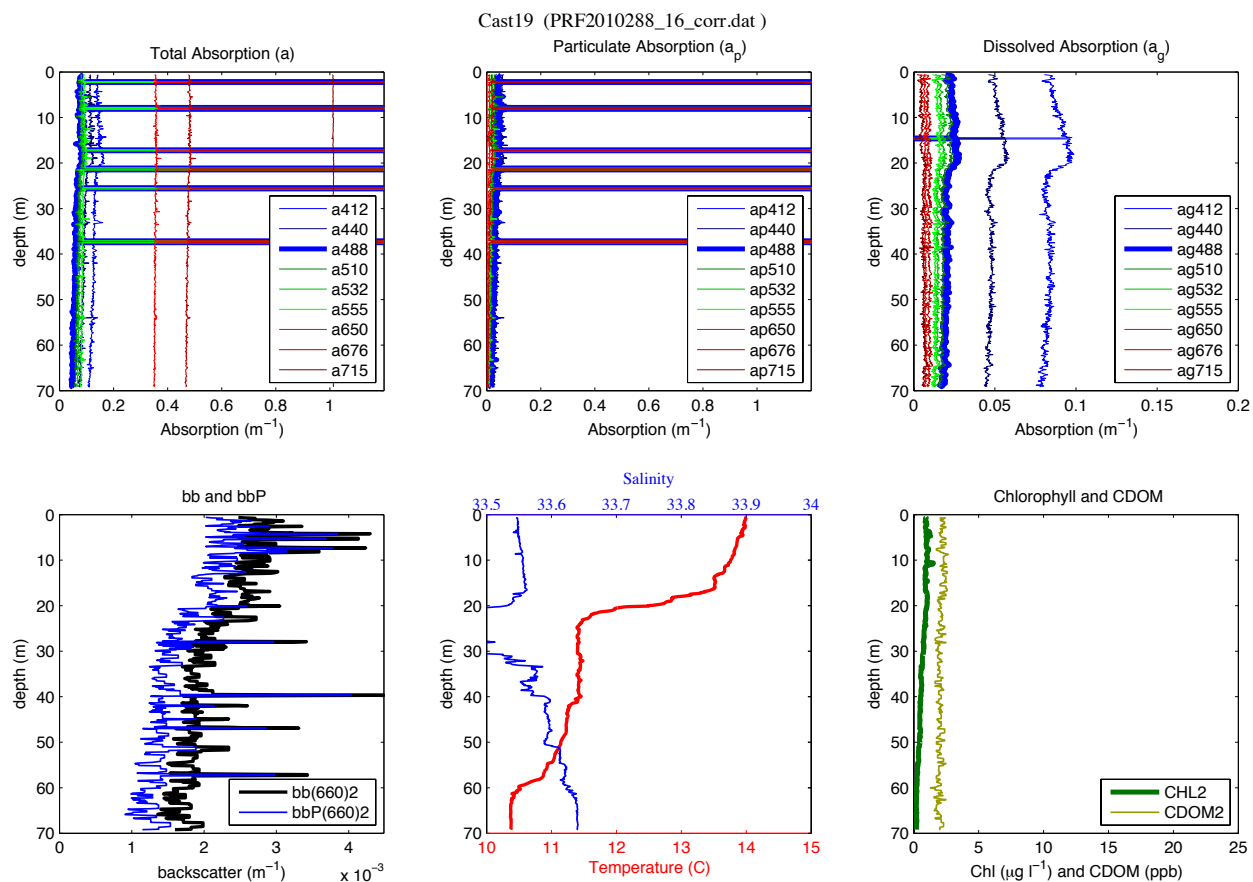


LISST

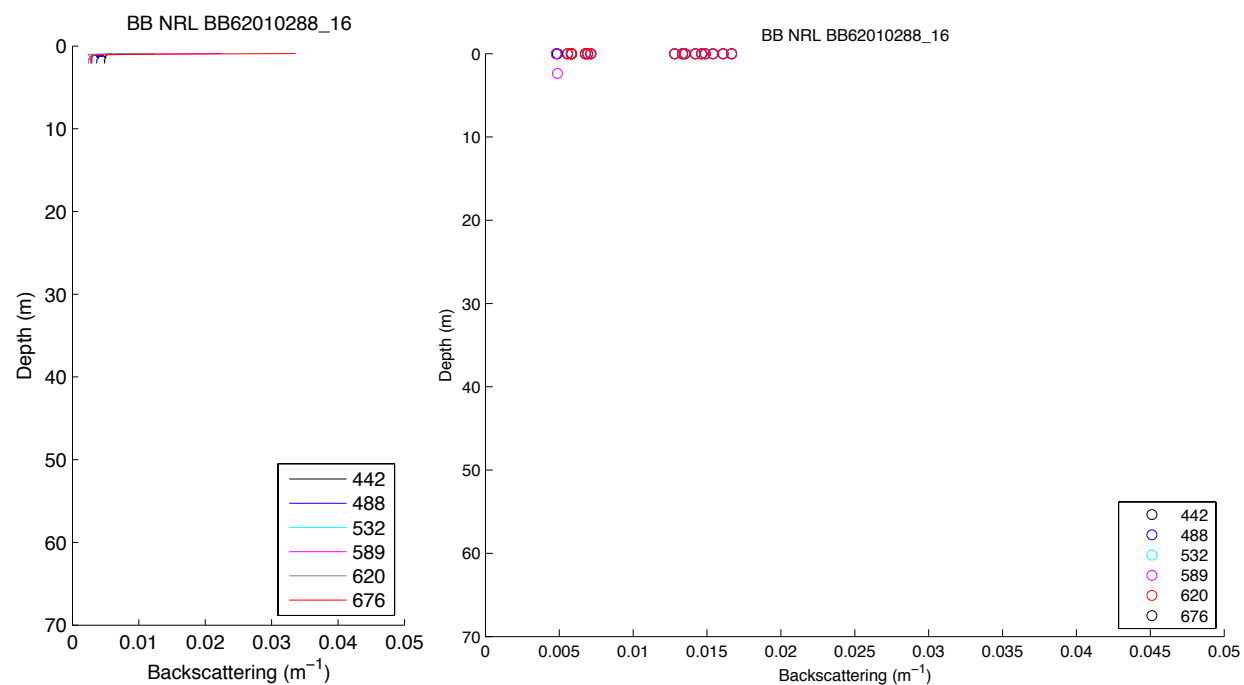
LISST – Cast 19



Optics Profile Package

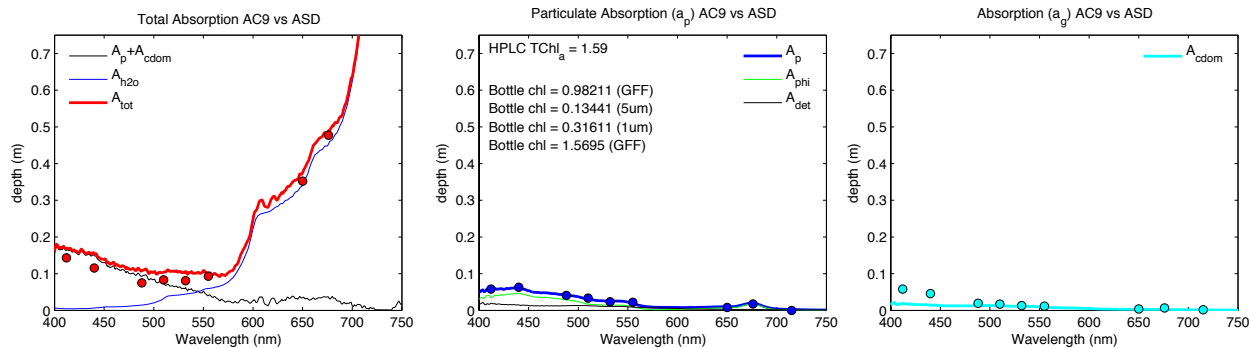


HydroScat

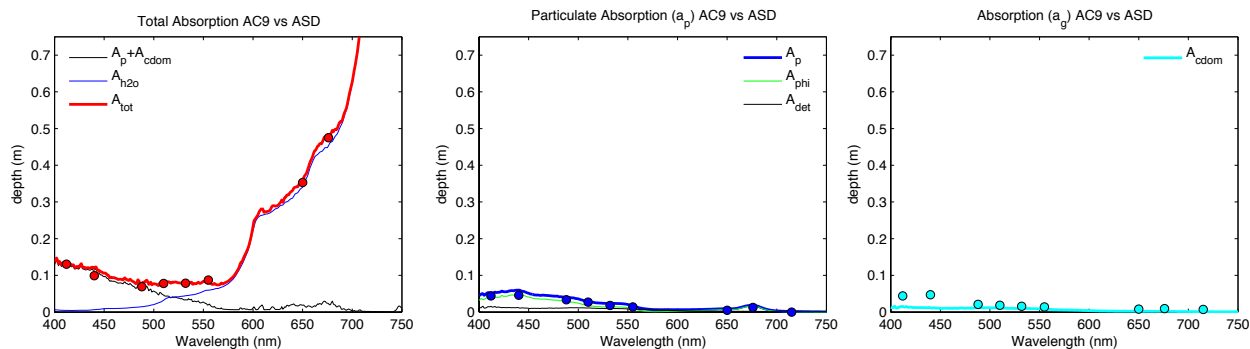


Filter Pad Absorption (w/ AC9)

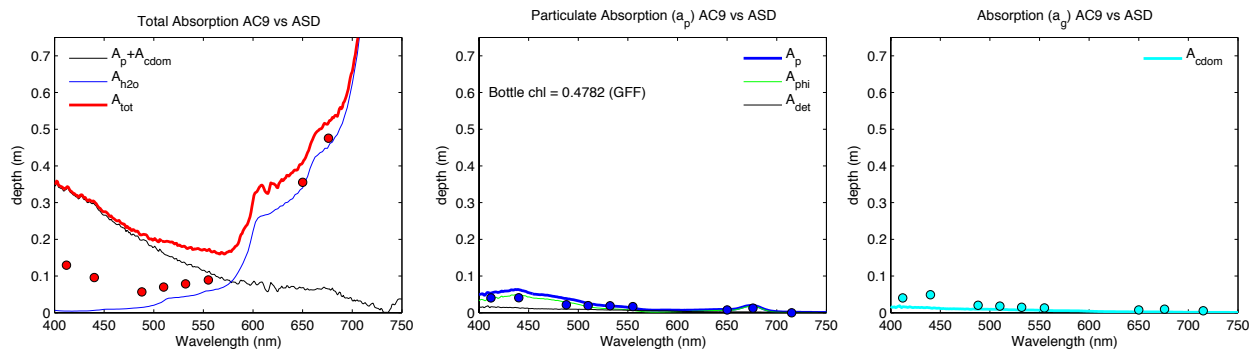
AC9 vs ASD Cast 19 – 0m (PRF2010288_16_corr.dat) CTD 27



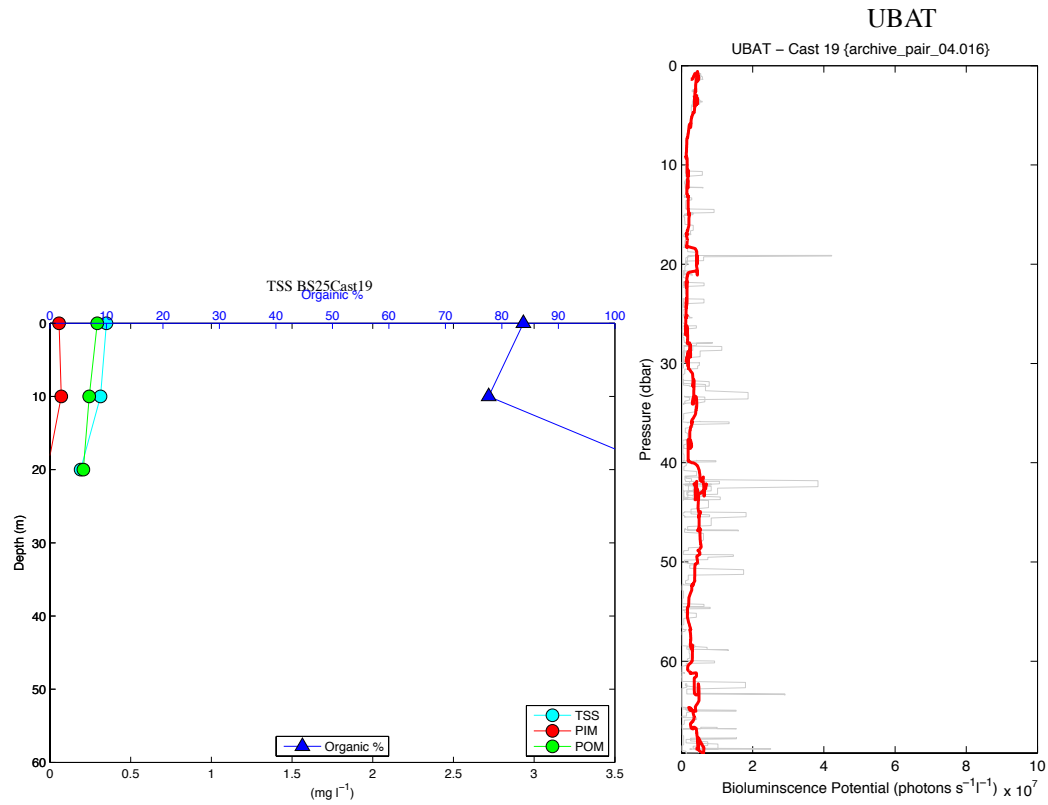
AC9 vs ASD Cast 19 – 25m (PRF2010288_16_corr.dat) CTD 27



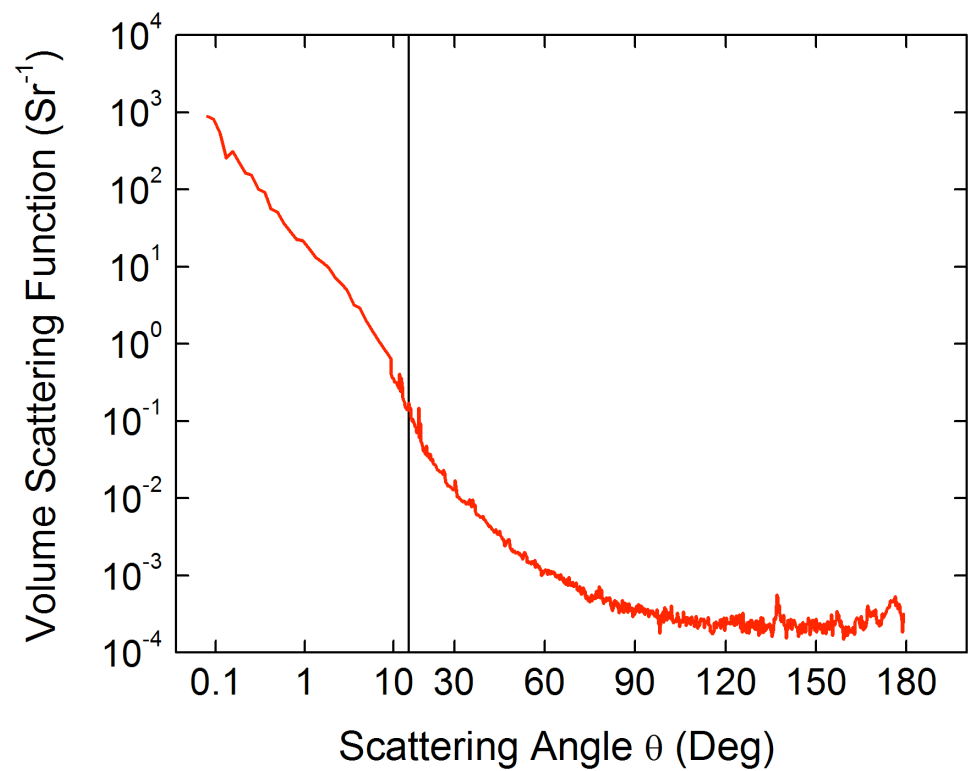
AC9 vs ASD Cast 19 – 40m (PRF2010288_16_corr.dat) CTD 27



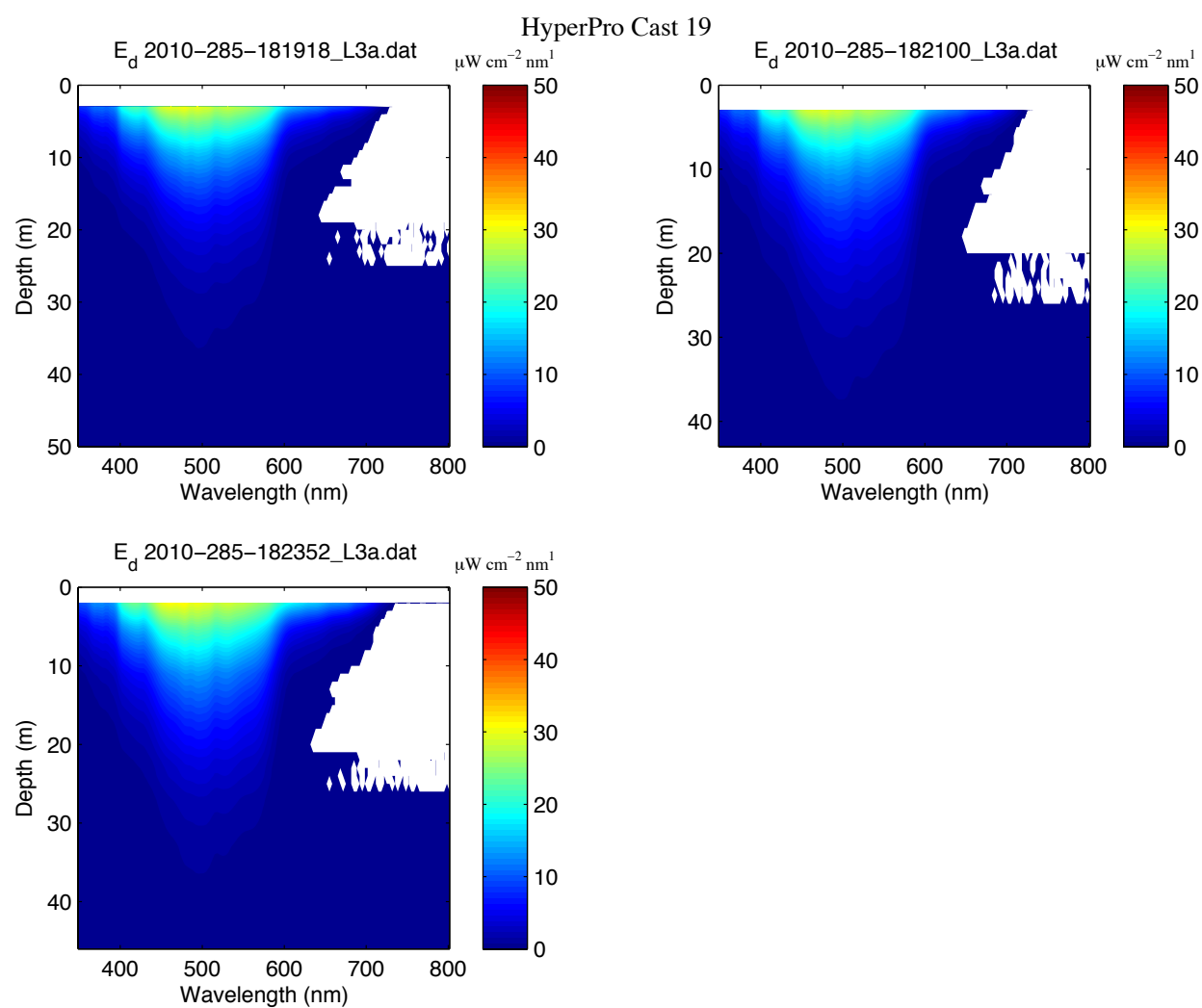
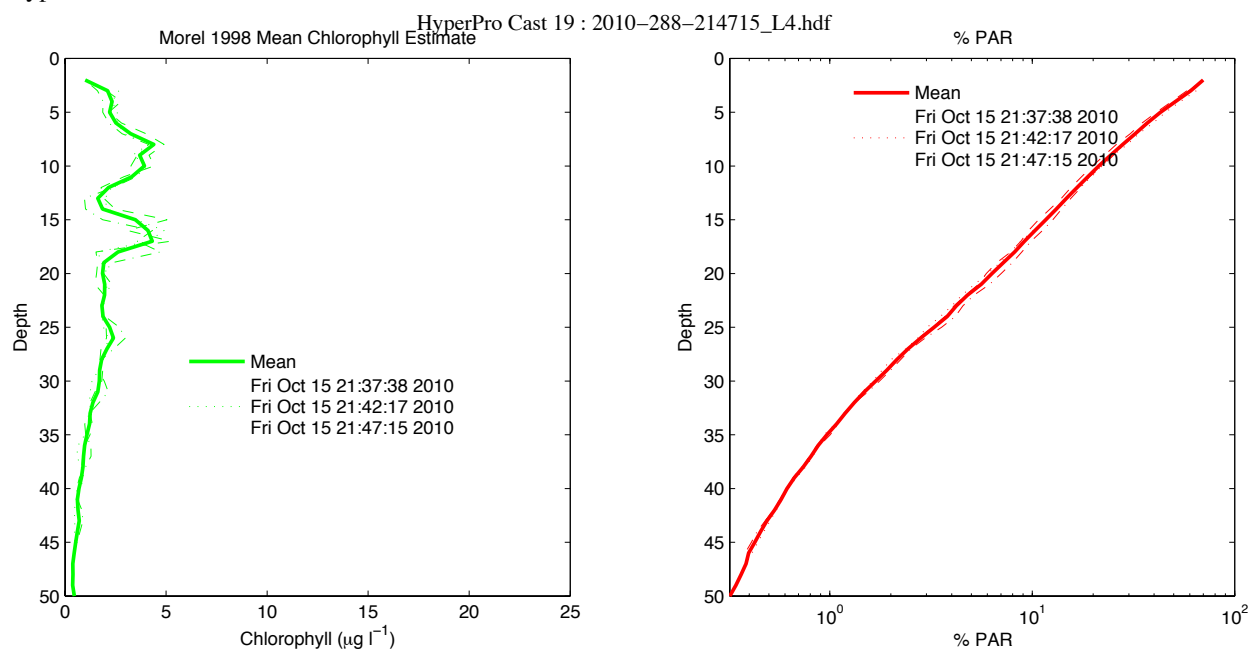
TSS



MVSC (532 nm)



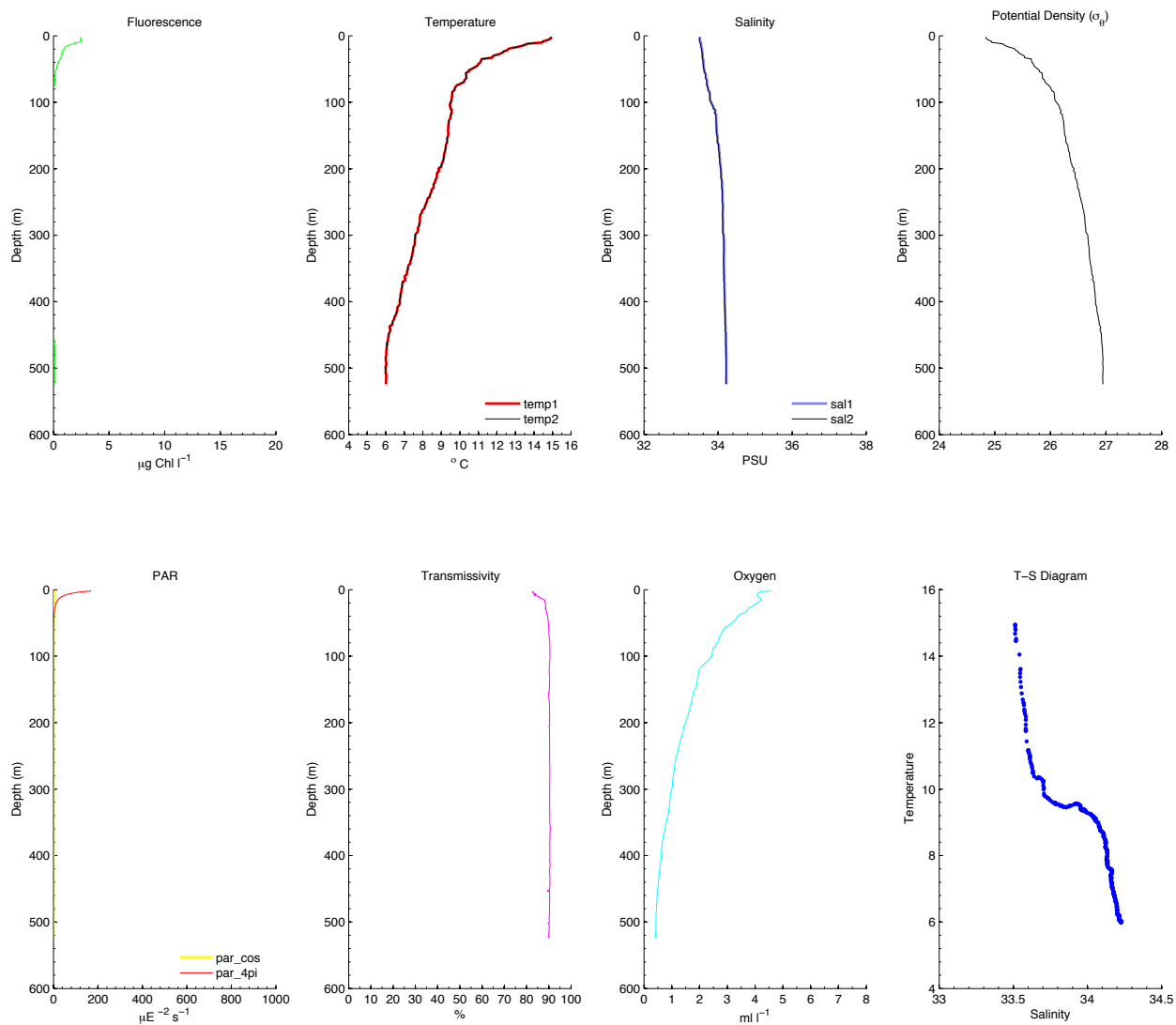
HyperPro



Cast 20 (1619 PDT; [Station BS24](#))
(overcast)

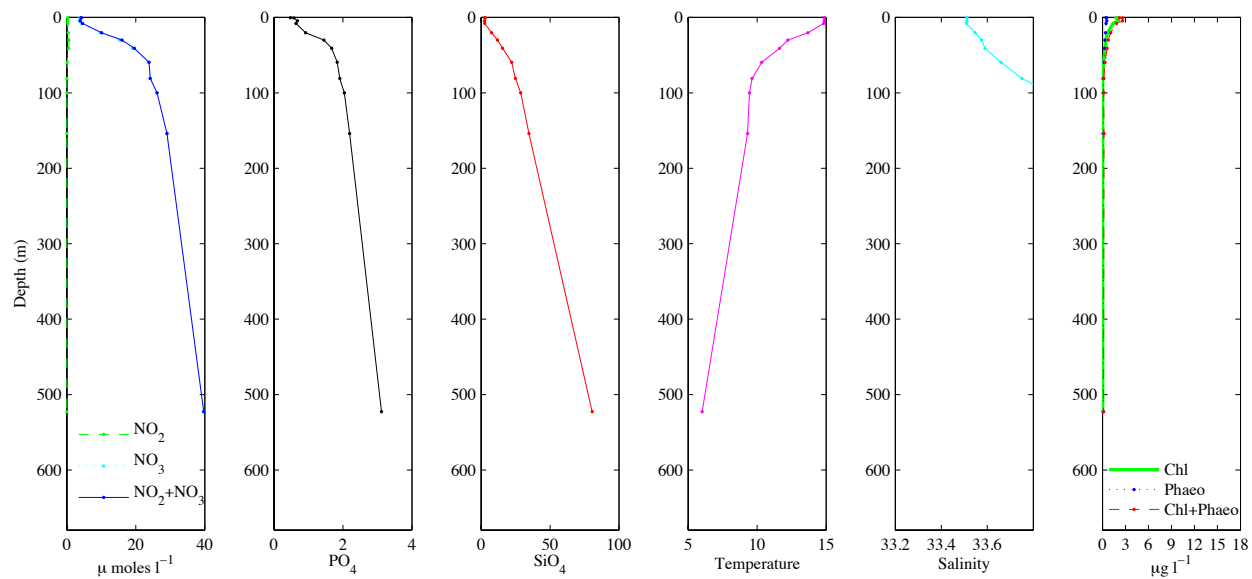
CTD

BIOSPACE 2010 Cast 20 (CTD24; 2010-10-15 23:16:00.000 UTC) CTD Downcast Data (Calibrated)



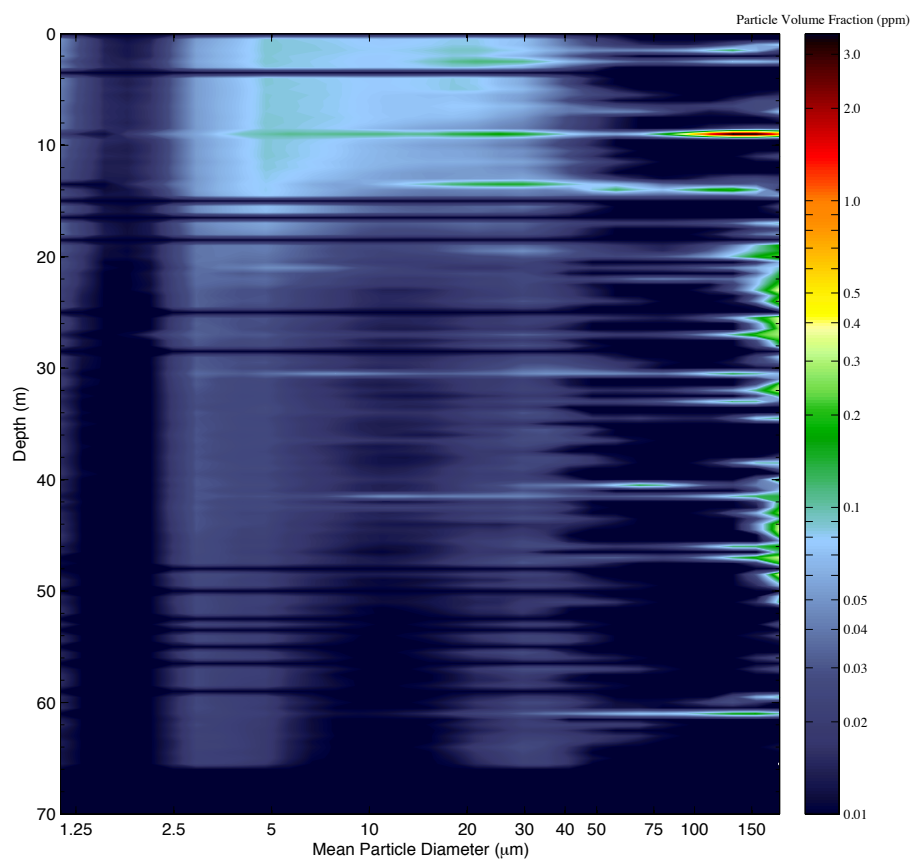
Bottle Nutrients and Chlorophyll

BIOSPACE 2010 Cast 20

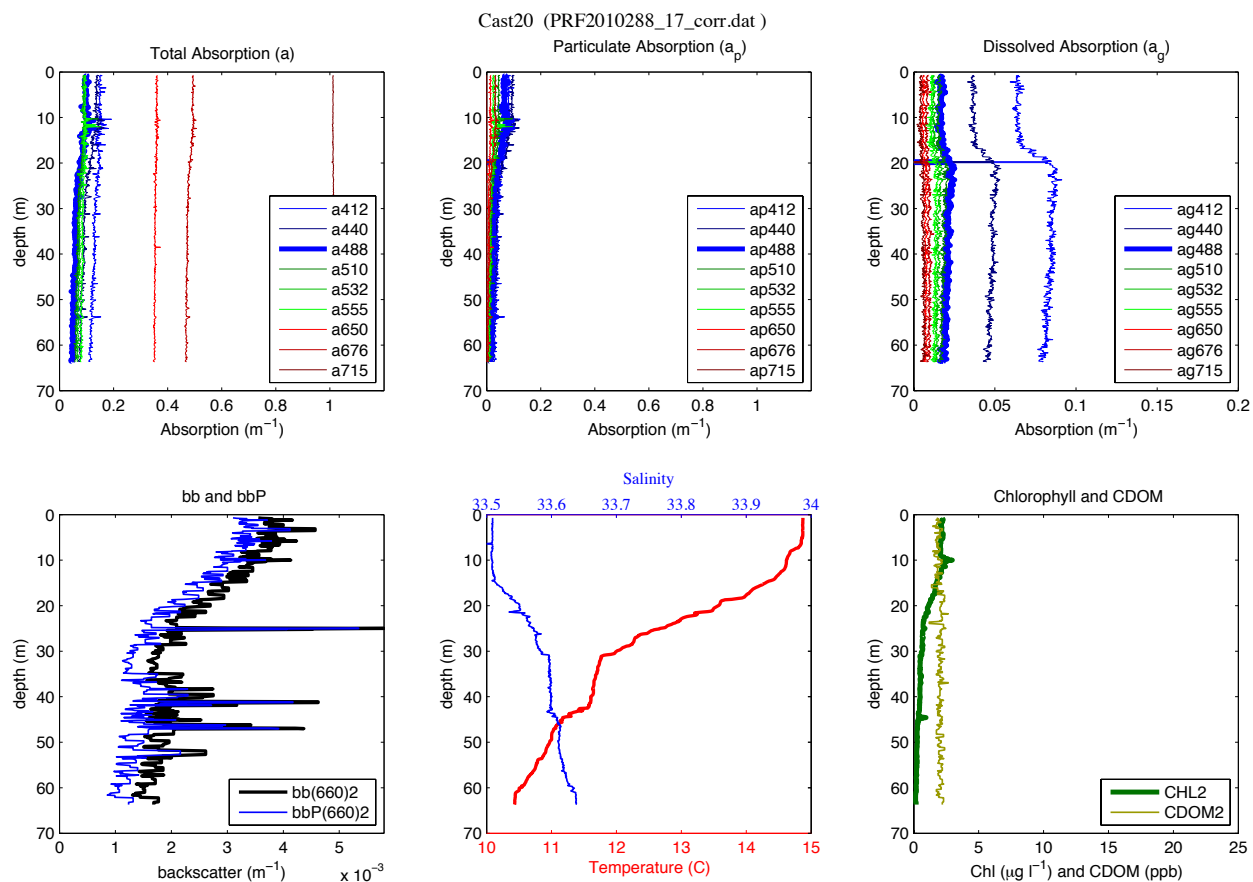


LISST

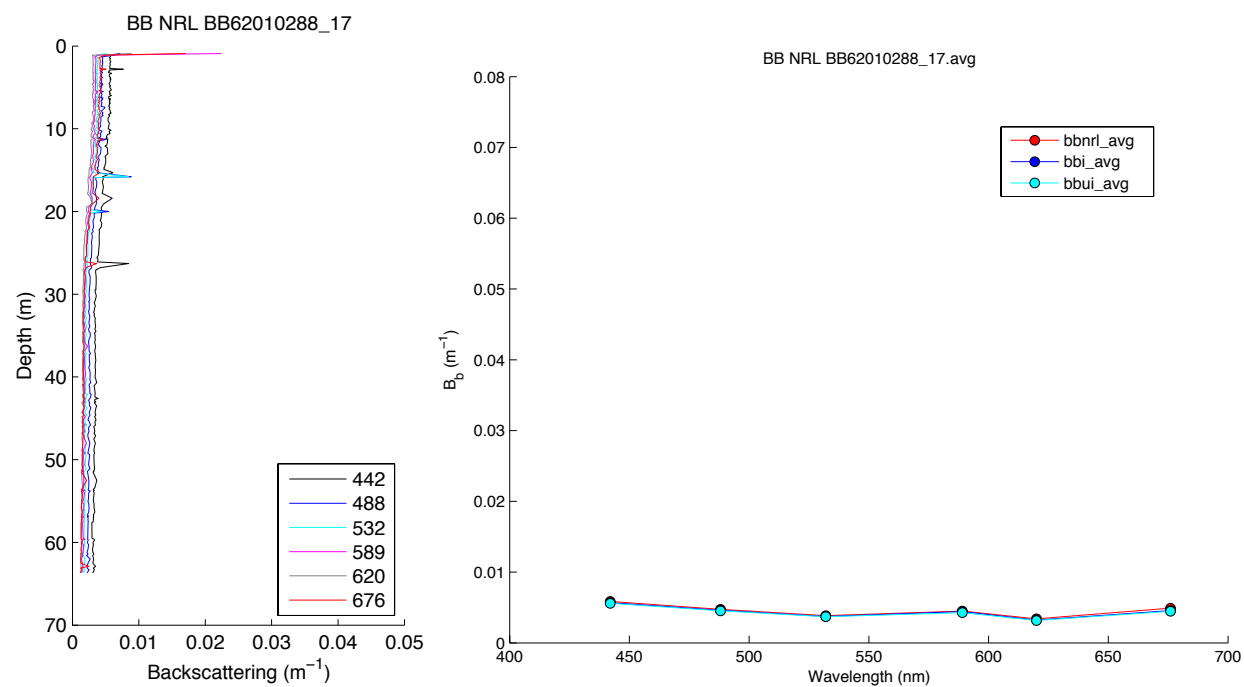
LISST – Cast 20



Optics Profile Package

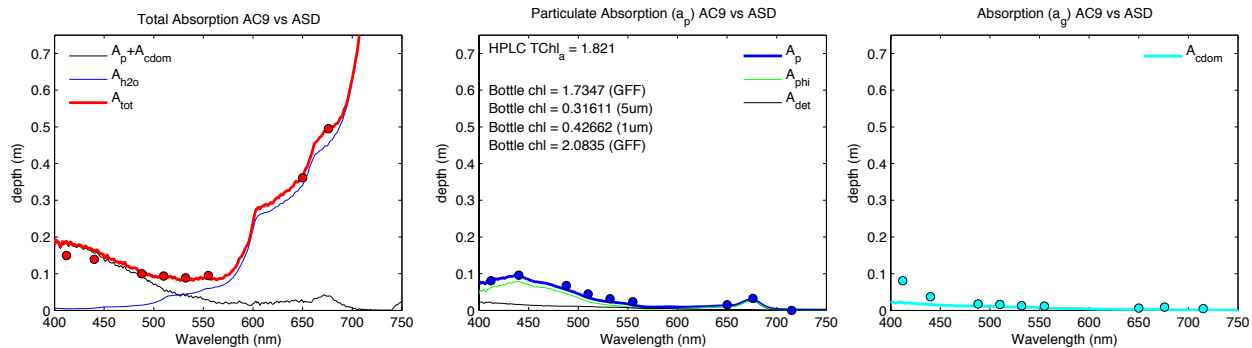


HydroScat

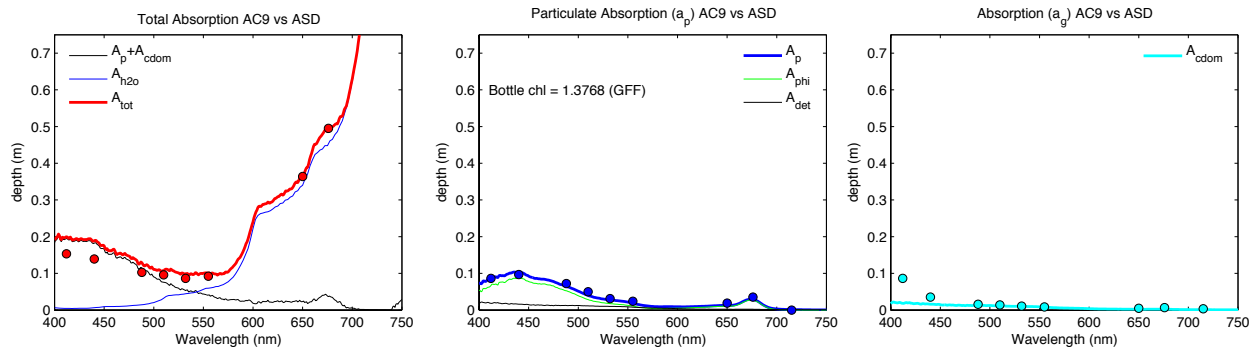


Filter Pad Absorption (w/ AC9)

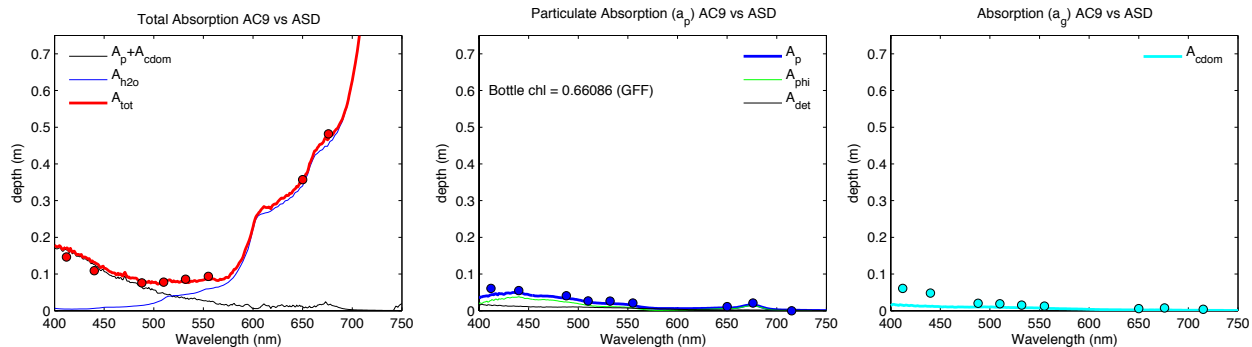
AC9 vs ASD Cast 20 – 0m (PRF2010288_17_corr.dat) CTD 26



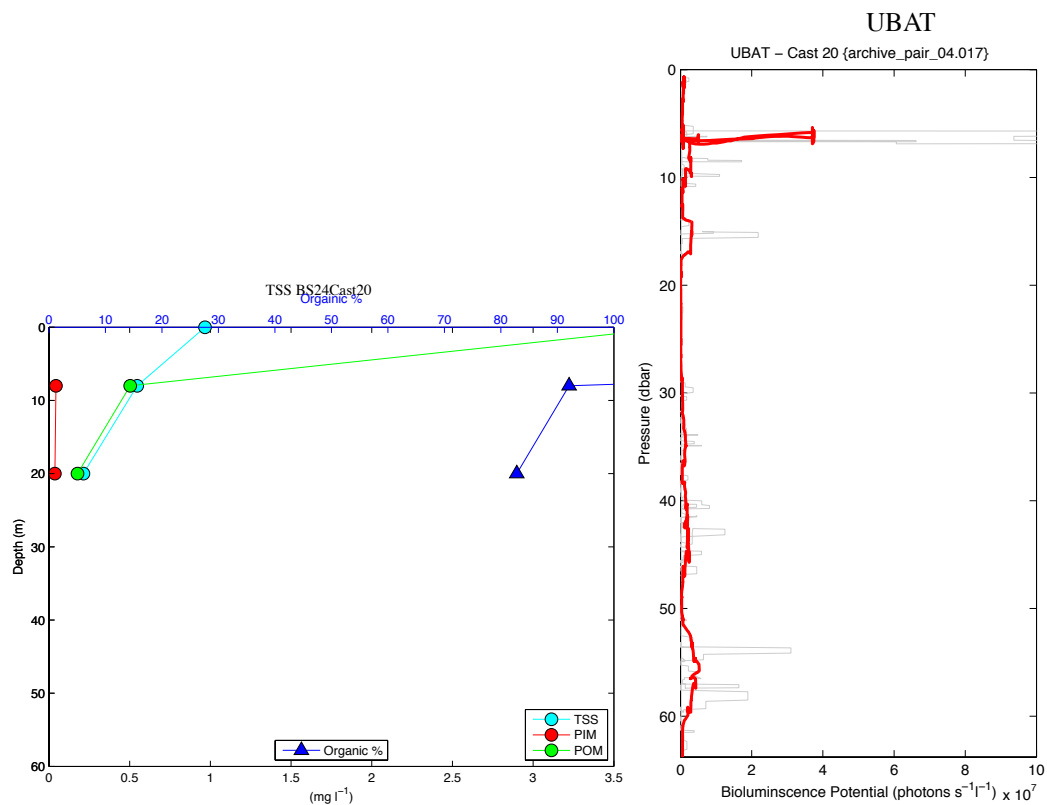
AC9 vs ASD Cast 20 – 10m (PRF2010288_17_corr.dat) CTD 26



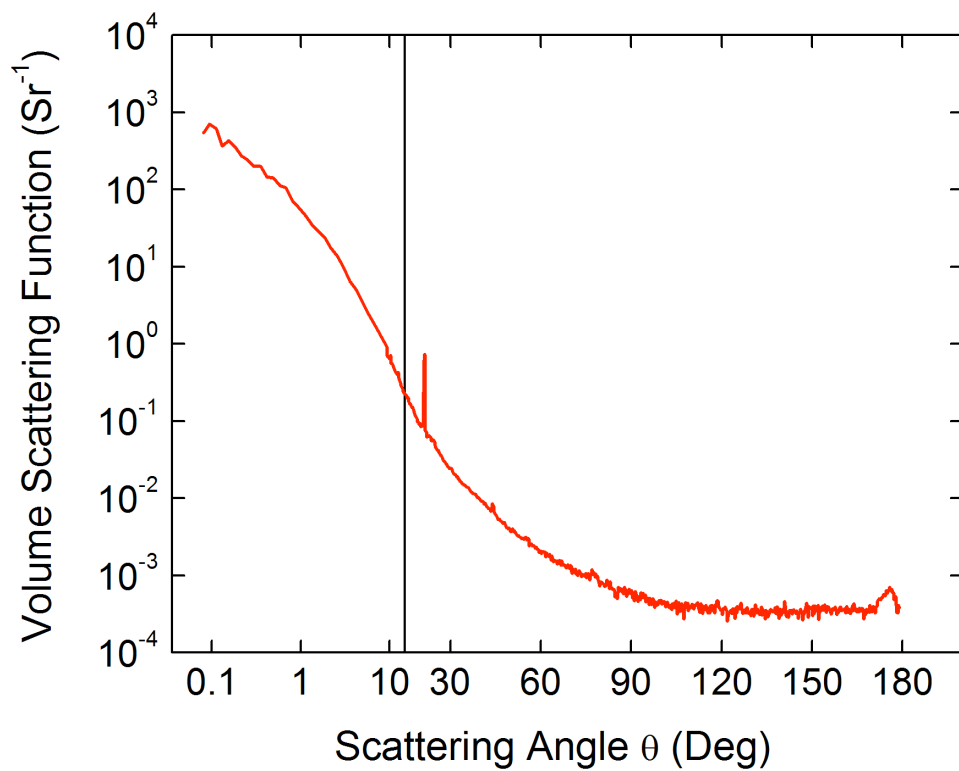
AC9 vs ASD Cast 20 – 20m (PRF2010288_17_corr.dat) CTD 26



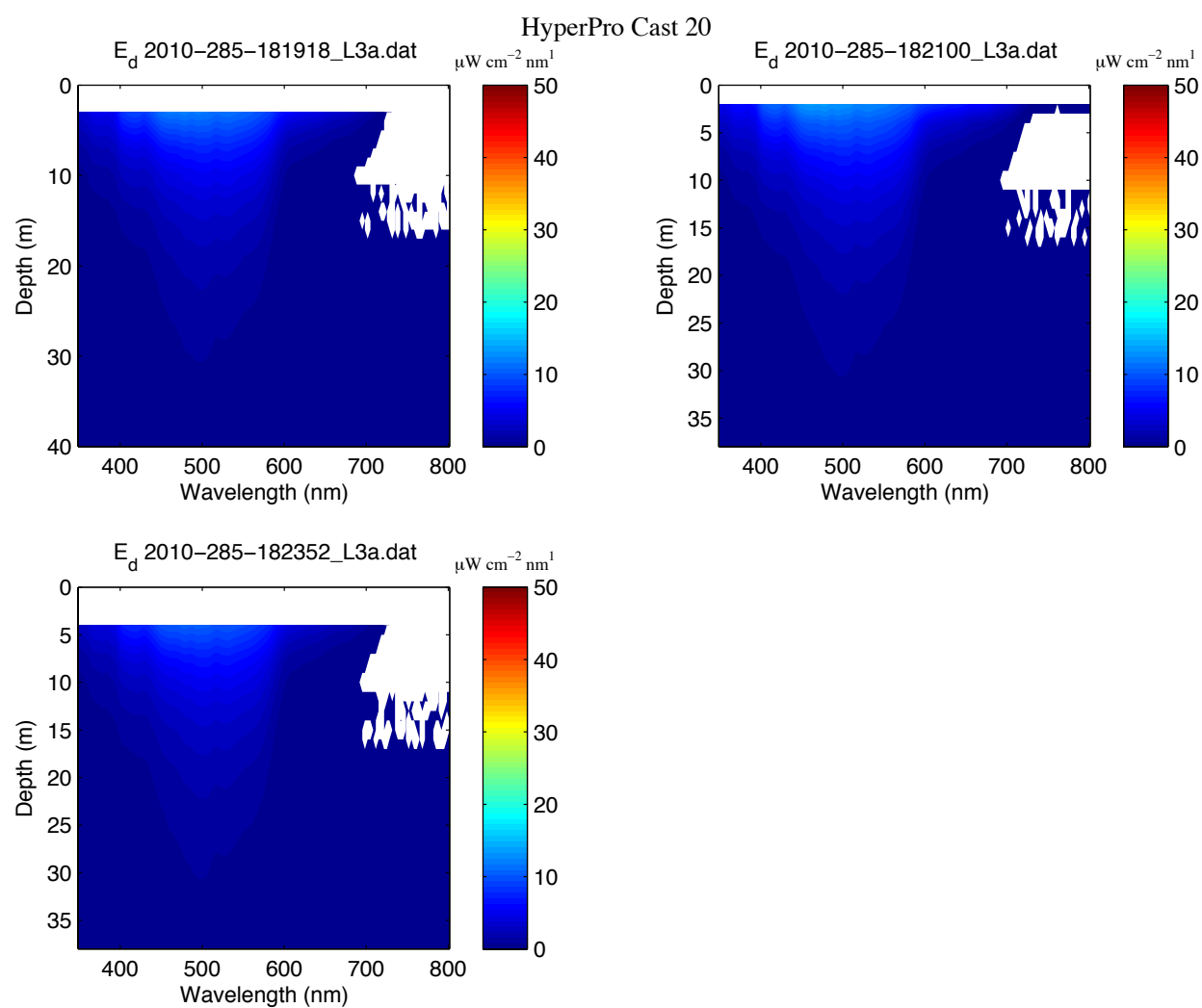
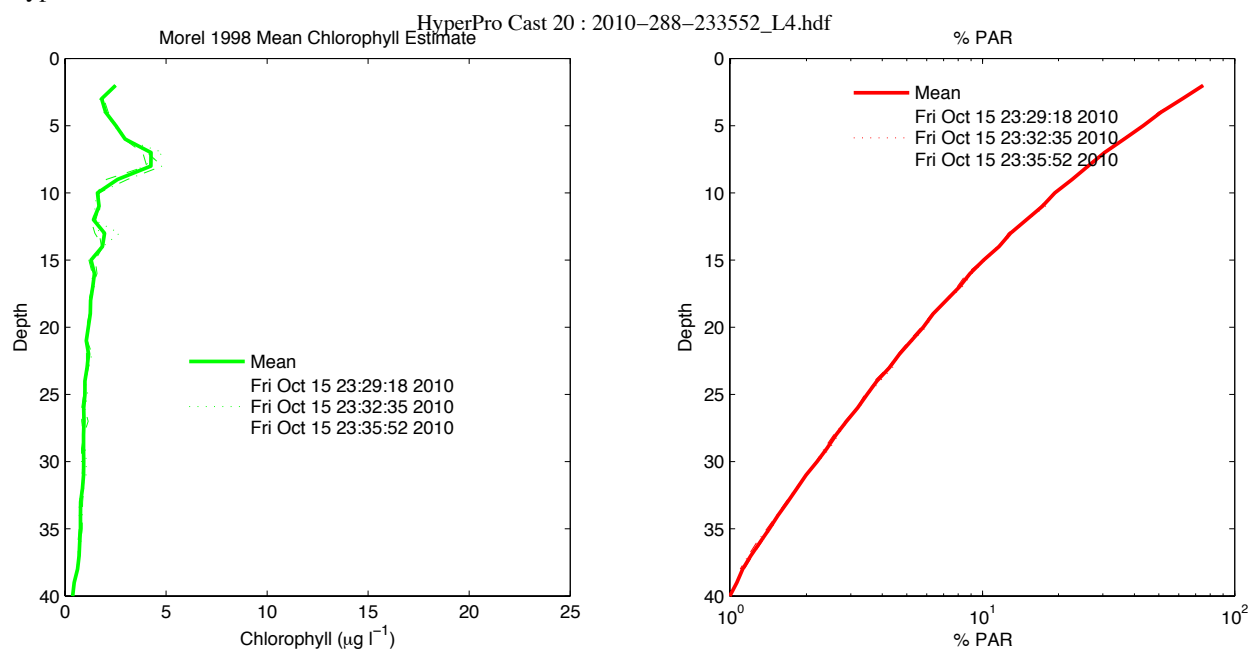
TSS



MVSC (532 nm)



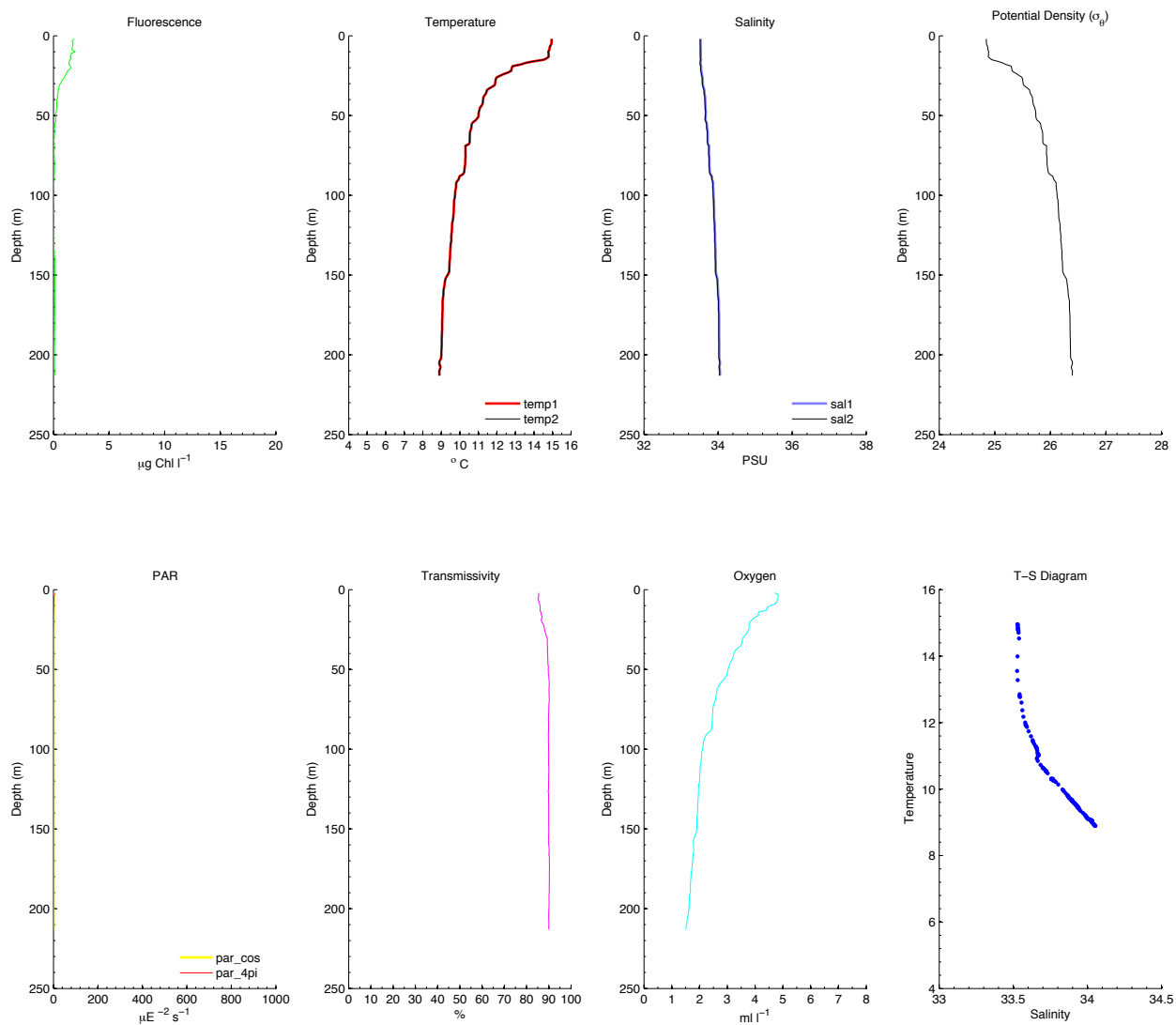
HyperPro



Cast 21 (1824 PDT; [Station BS09](#))
(overcast, twilight)

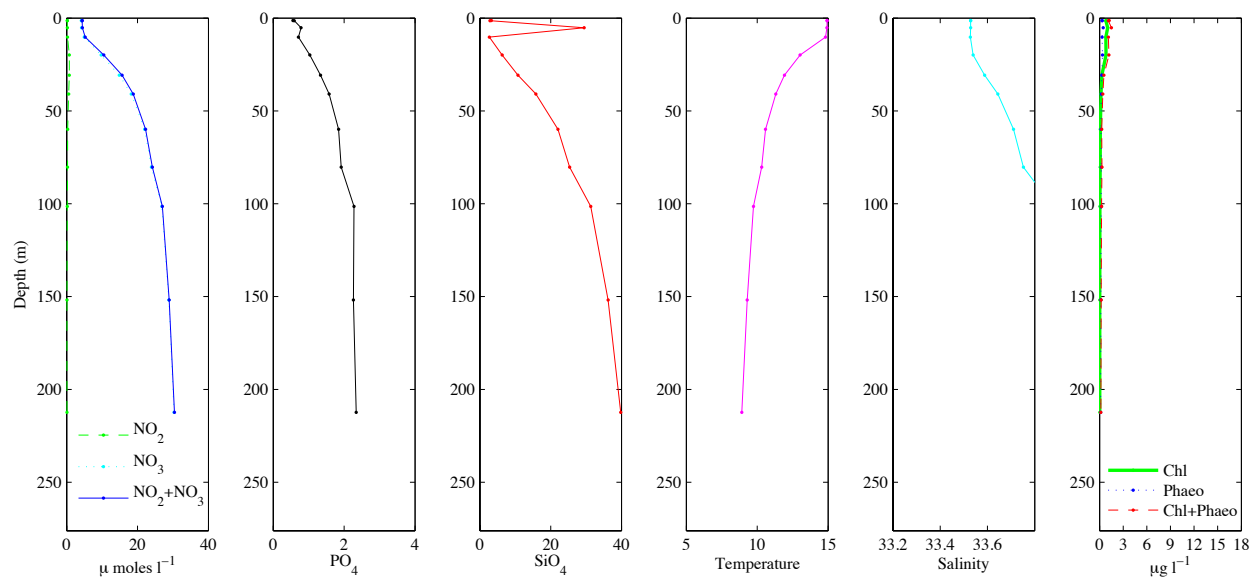
CTD

BIOSPACE 2010 Cast 21 (CTD09; 2010-10-16 01:23:00.000 UTC) CTD Downcast Data (Calibrated)



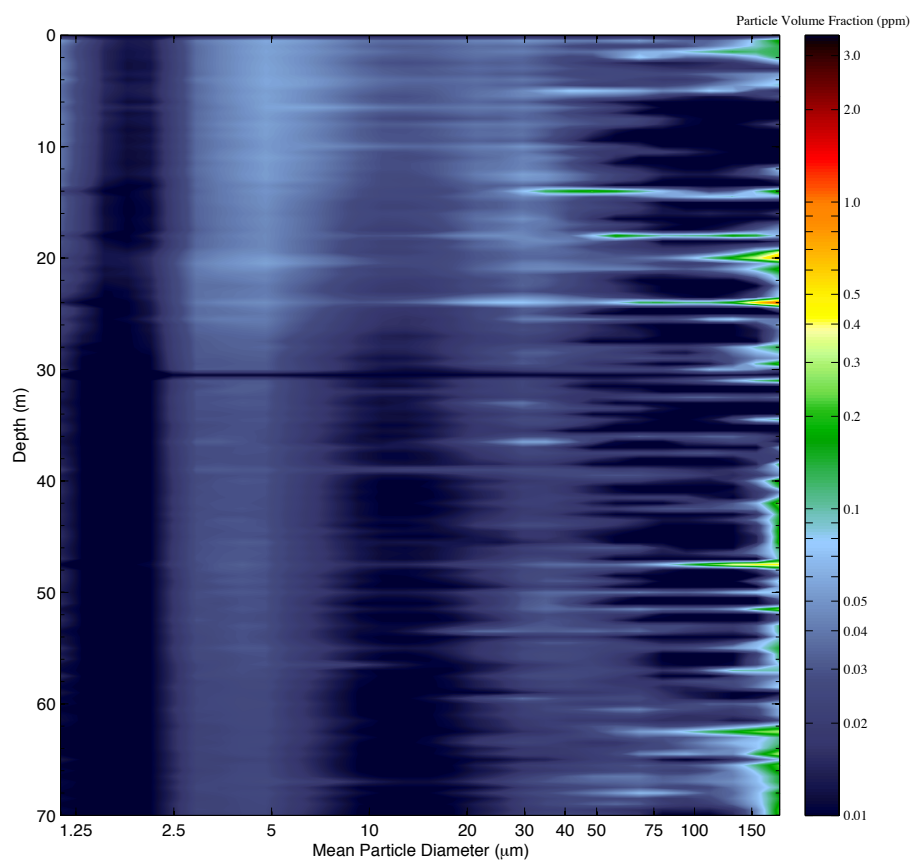
Bottle Nutrients and Chlorophyll

BIOSPACE 2010 Cast 21

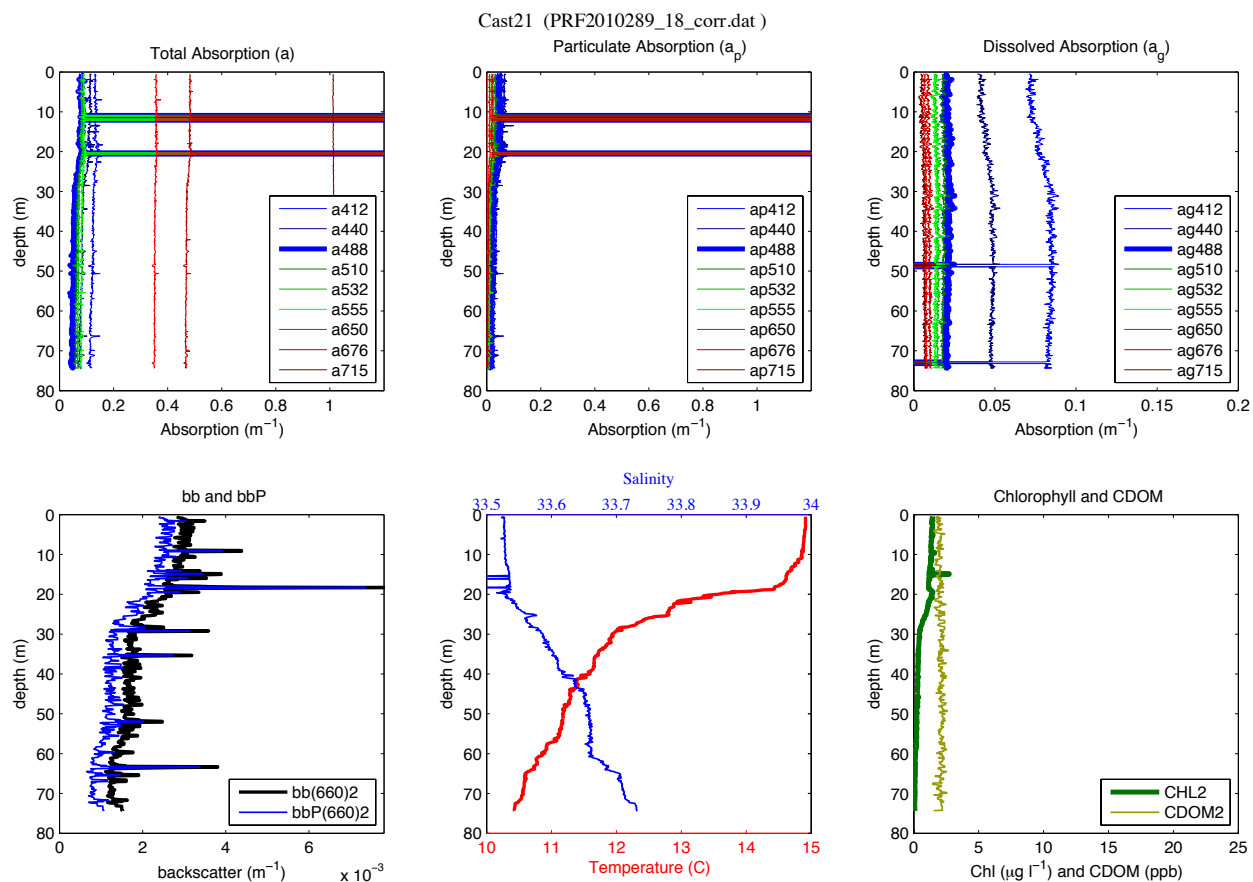


LISST

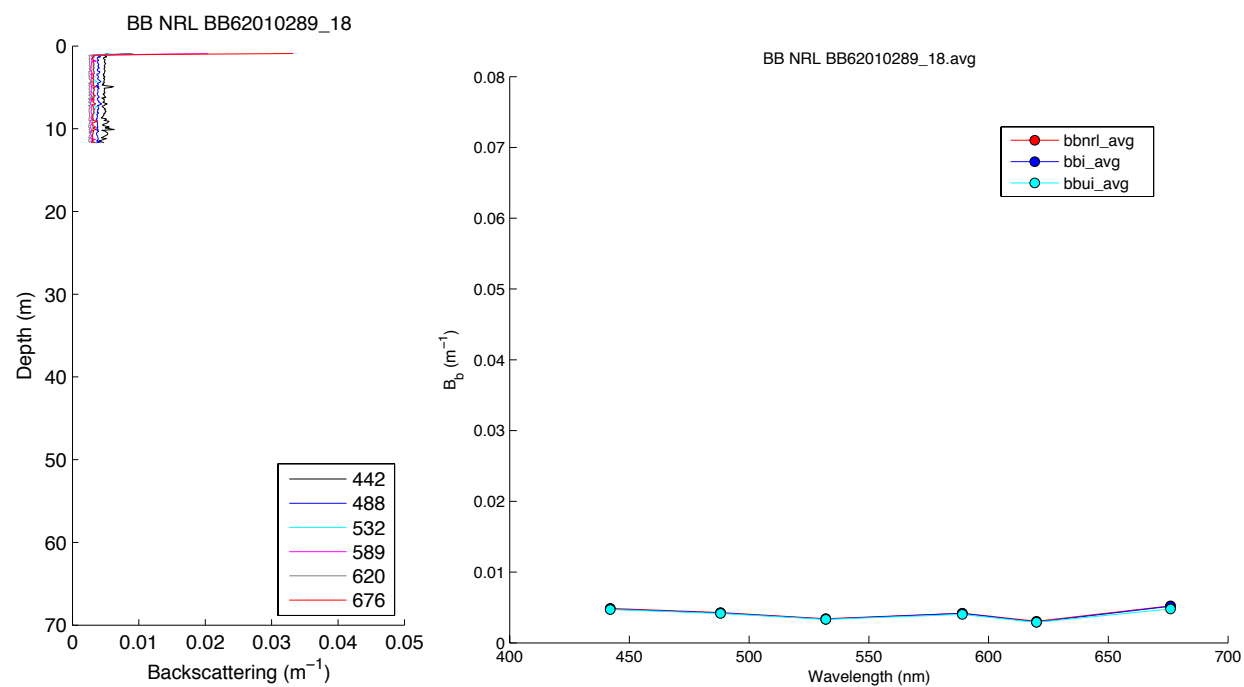
LISST – Cast 21



Optics Profile Package

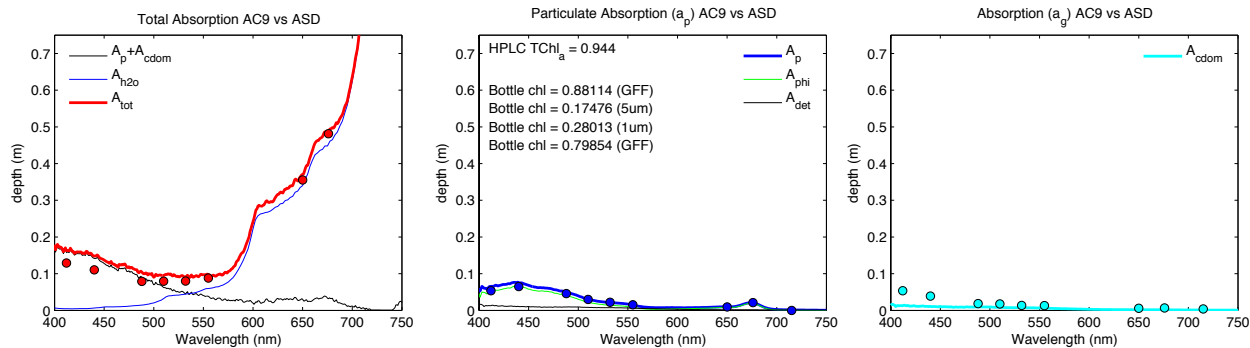


HydroScat

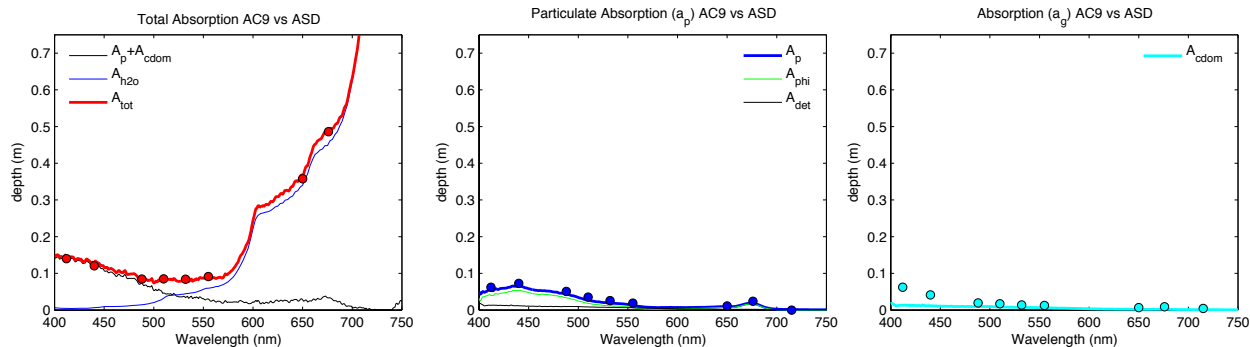


Filter Pad Absorption (w/ AC9)

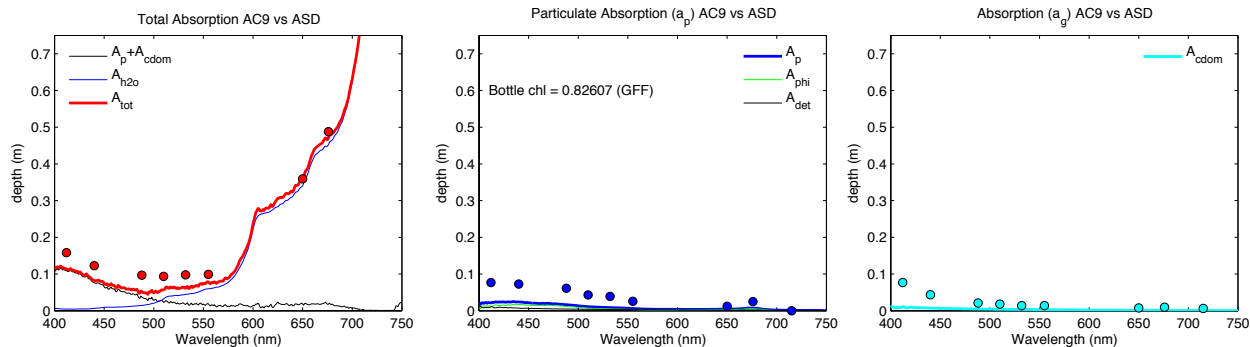
AC9 vs ASD Cast 21 – 0m (PRF2010289_18_corr.dat) CTD 25



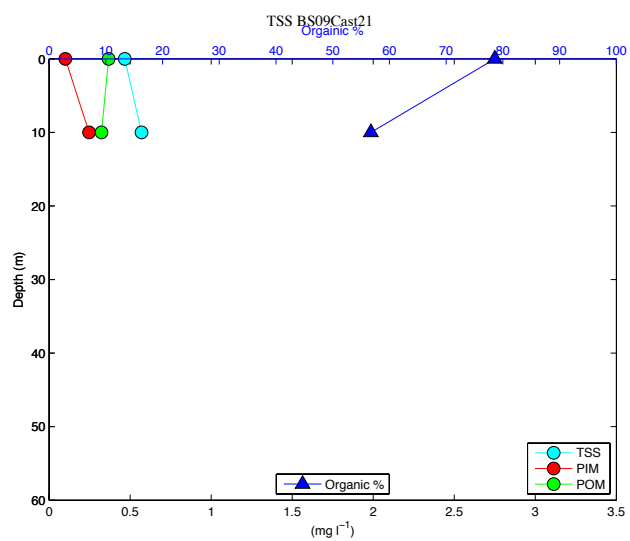
AC9 vs ASD Cast 21 – 8m (PRF2010289_18_corr.dat) CTD 25



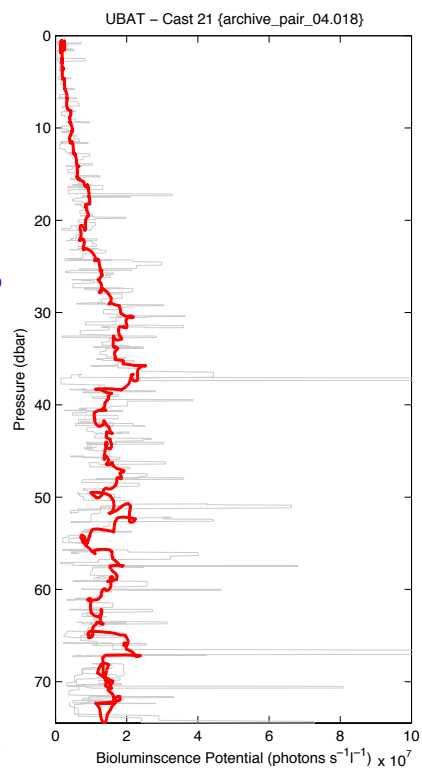
AC9 vs ASD Cast 21 – 20m (PRF2010289_18_corr.dat) CTD 25



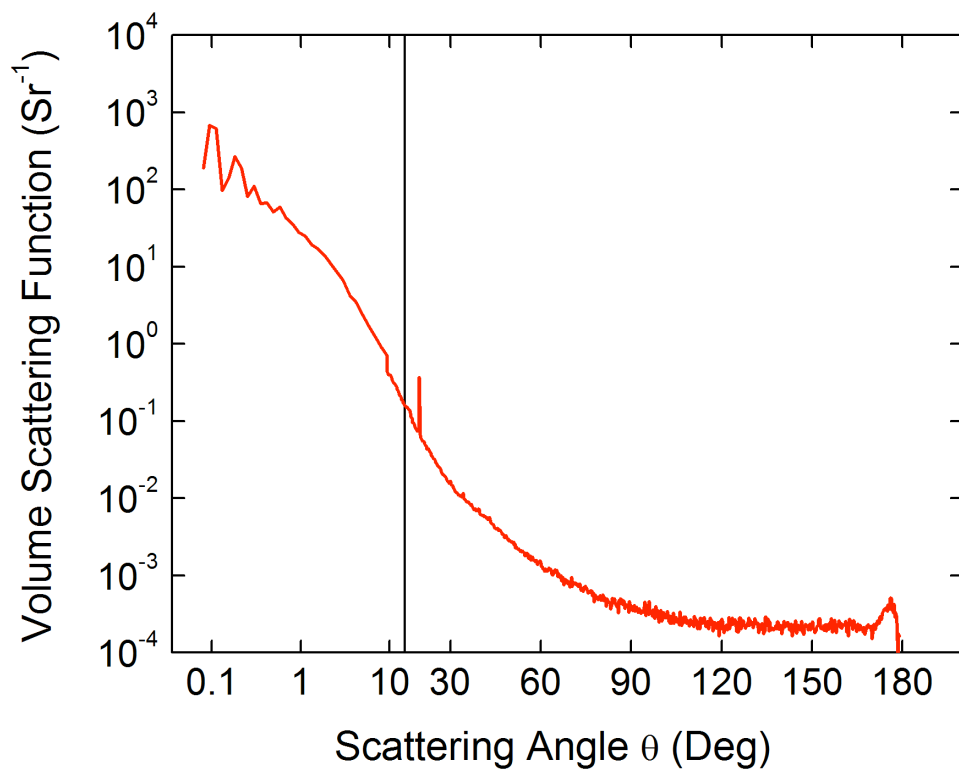
TSS



UBAT



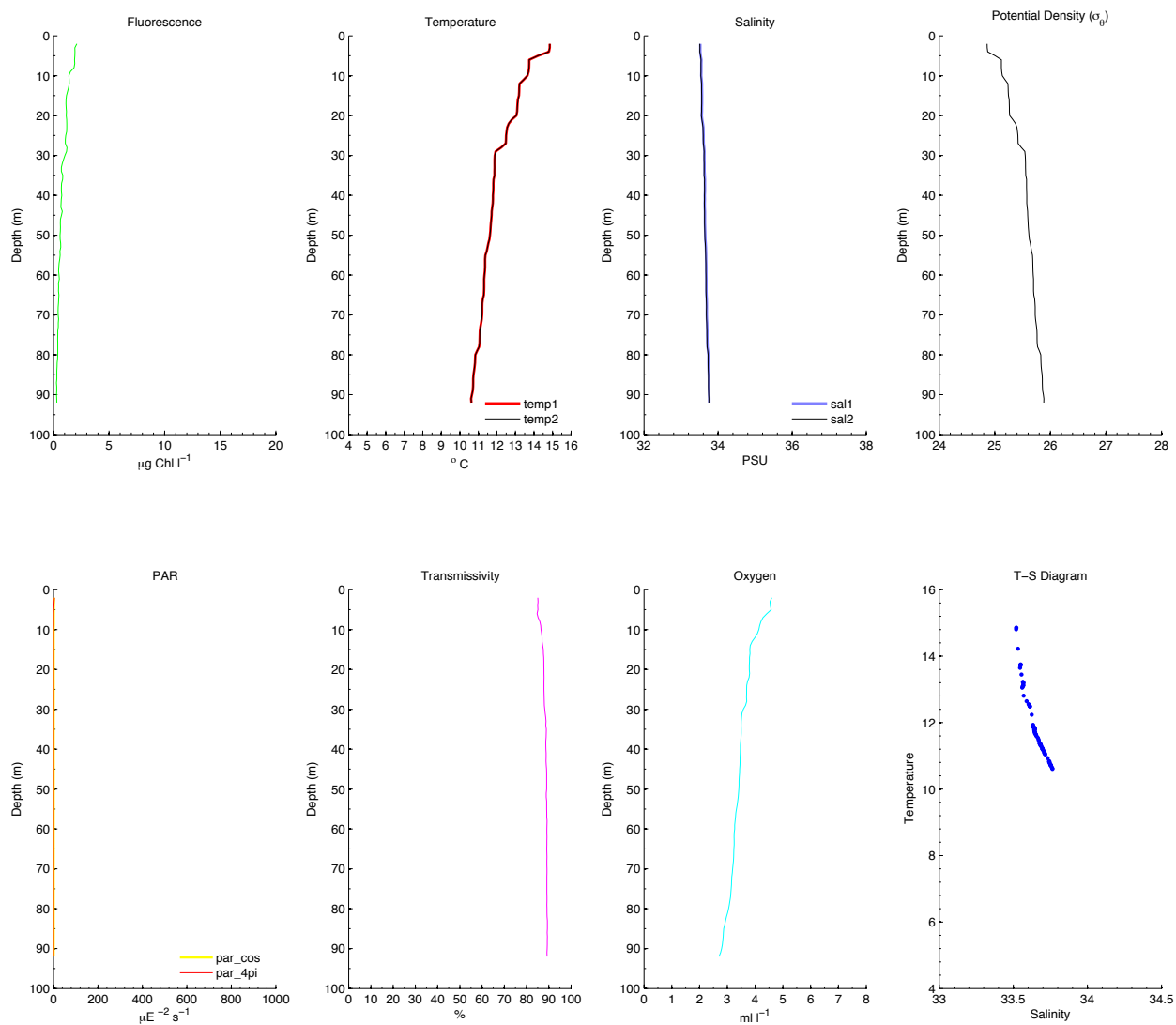
MVSC (532 nm)



Cast 22 (1938 PDT; [Station BS10](#))
(overcast, dark)

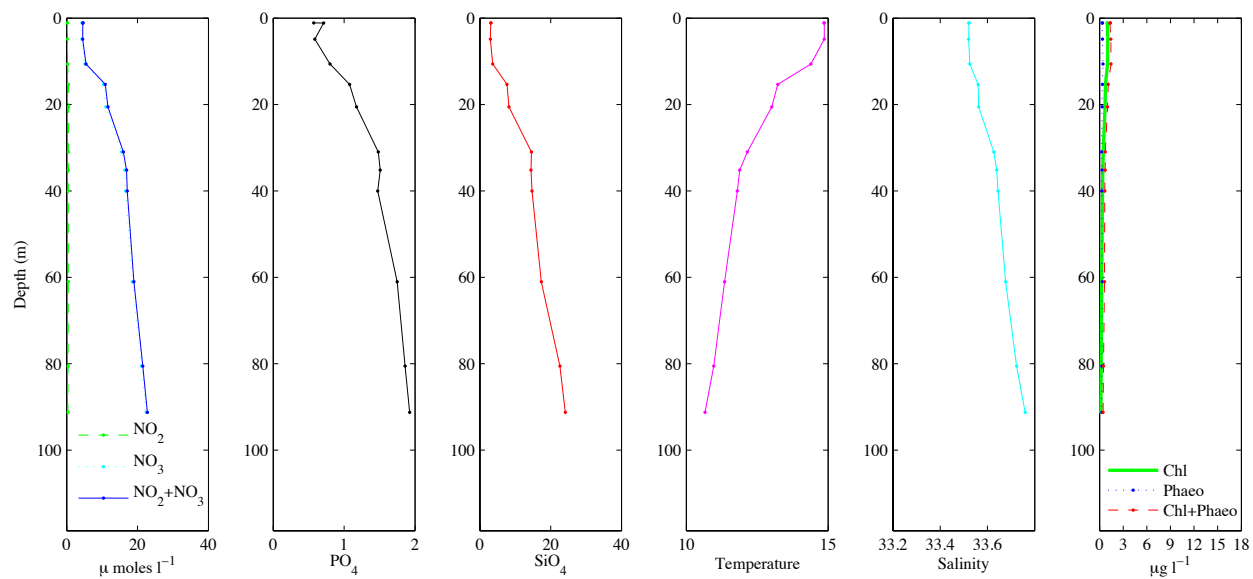
CTD

BIOSPACE 2010 Cast 22 (CTD10; 2010-10-16 02:31:00.000 UTC) CTD Downcast Data (Calibrated)



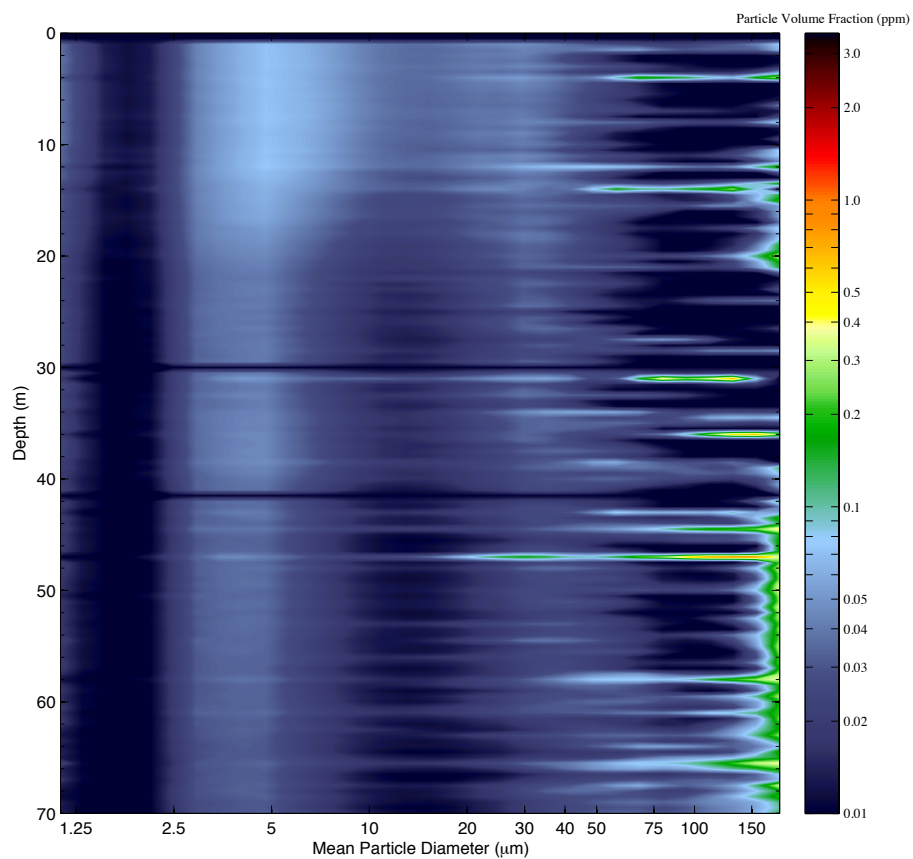
Bottle Nutrients and Chlorophyll

BIOSPACE 2010 Cast 22

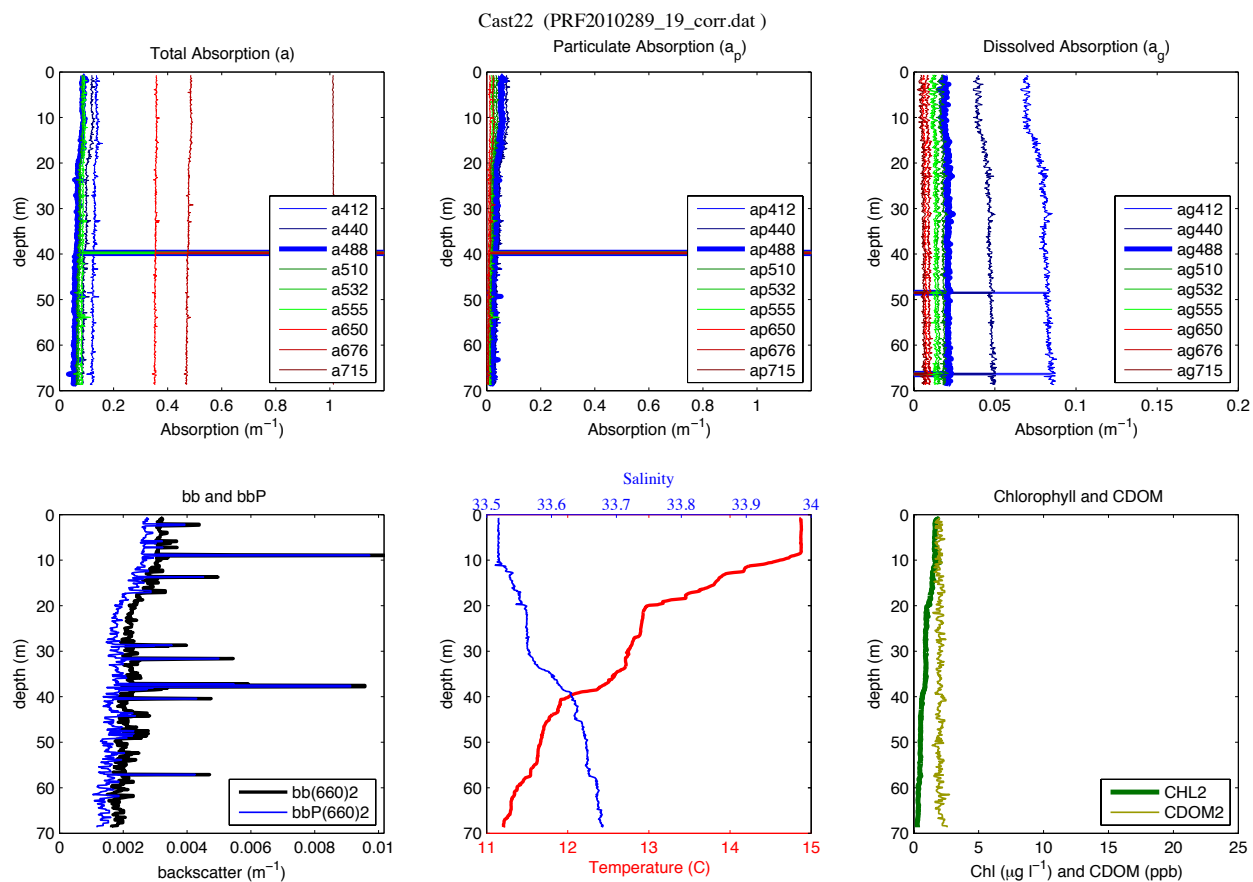


LISST

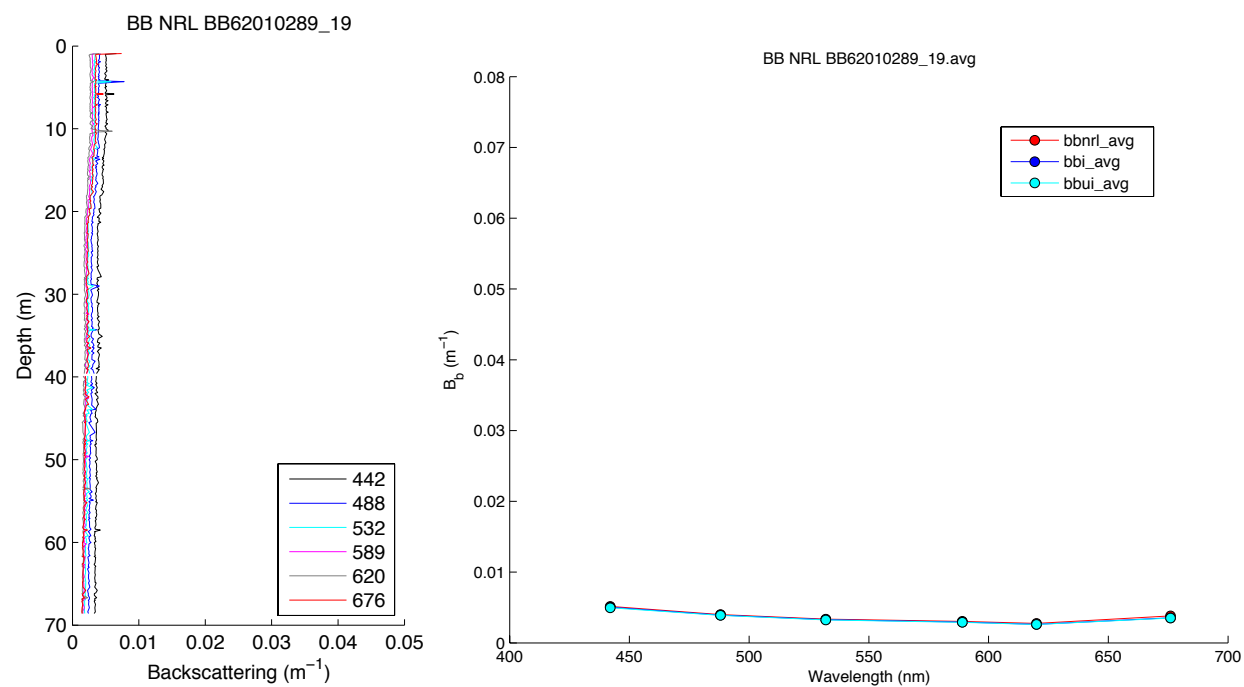
LISST – Cast 22



Optics Profile Package

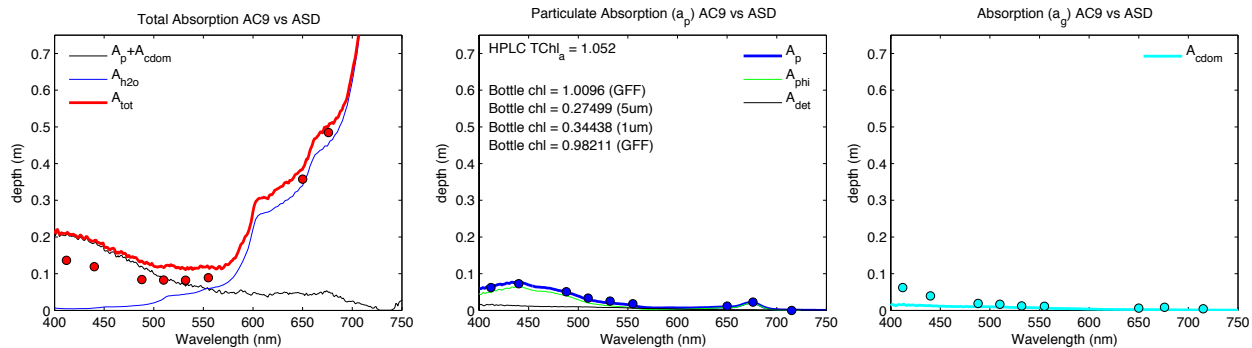


HydroScat

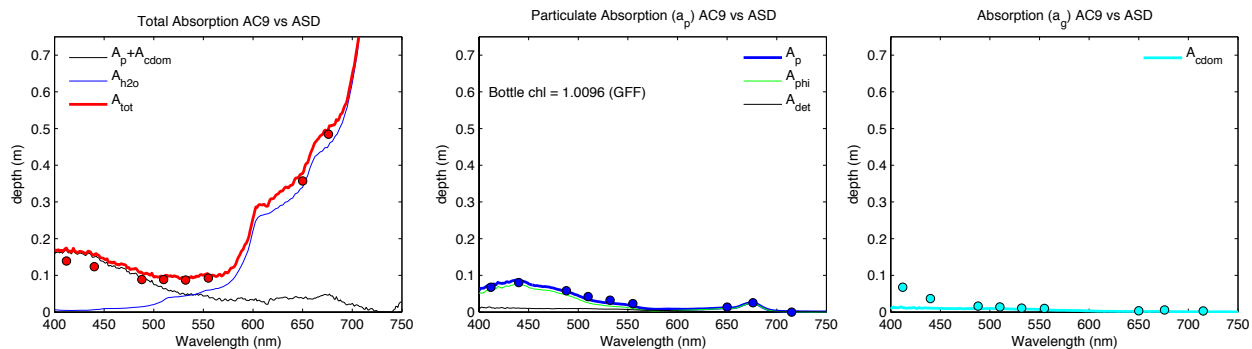


Filter Pad Absorption (w/ AC9)

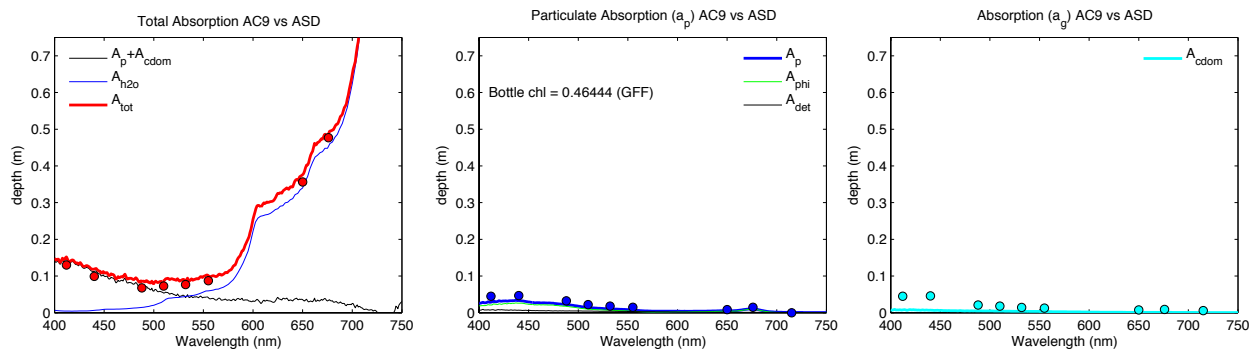
AC9 vs ASD Cast 22 – 0m (PRF2010289_19_corr.dat) CTD 24



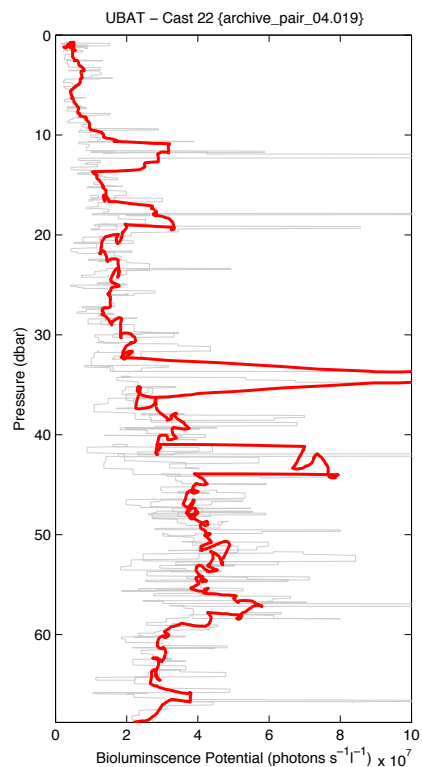
AC9 vs ASD Cast 22 – 10m (PRF2010289_19_corr.dat) CTD 24



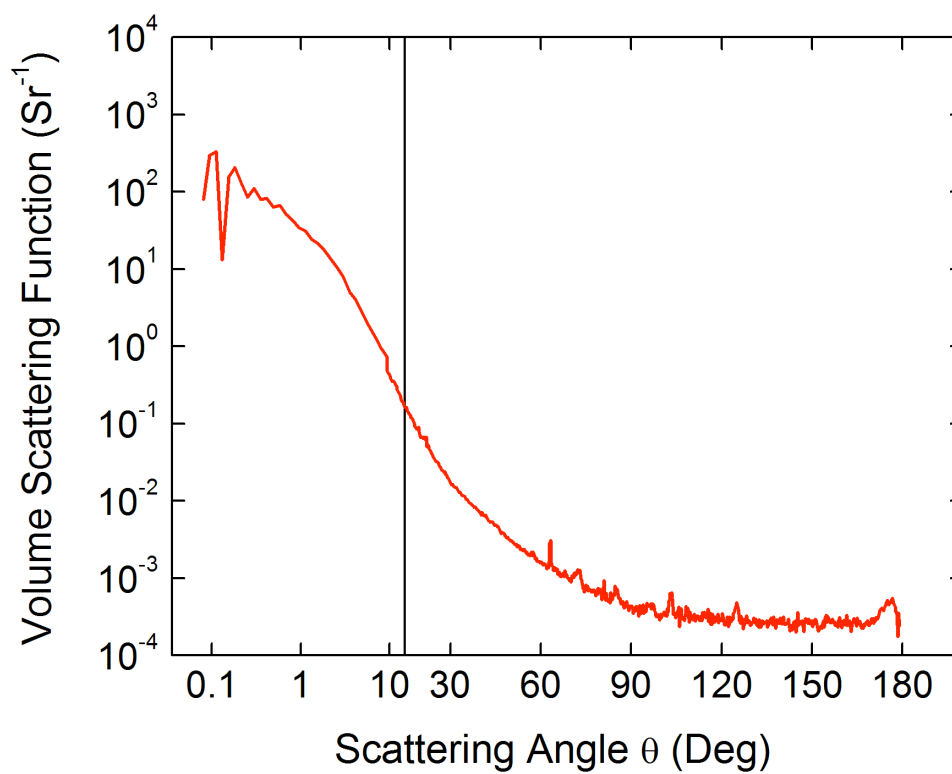
AC9 vs ASD Cast 22 – 30m (PRF2010289_19_corr.dat) CTD 24



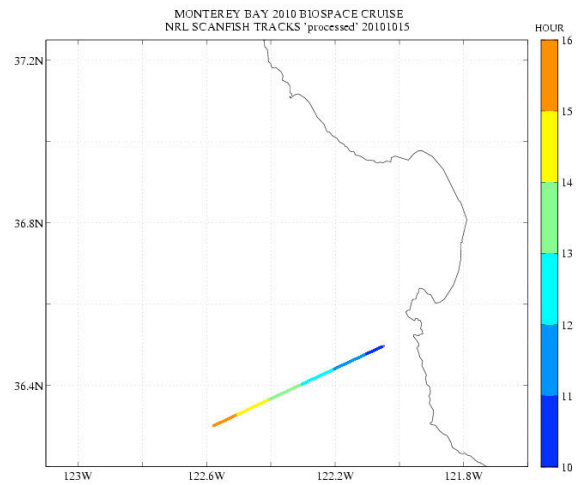
UBAT



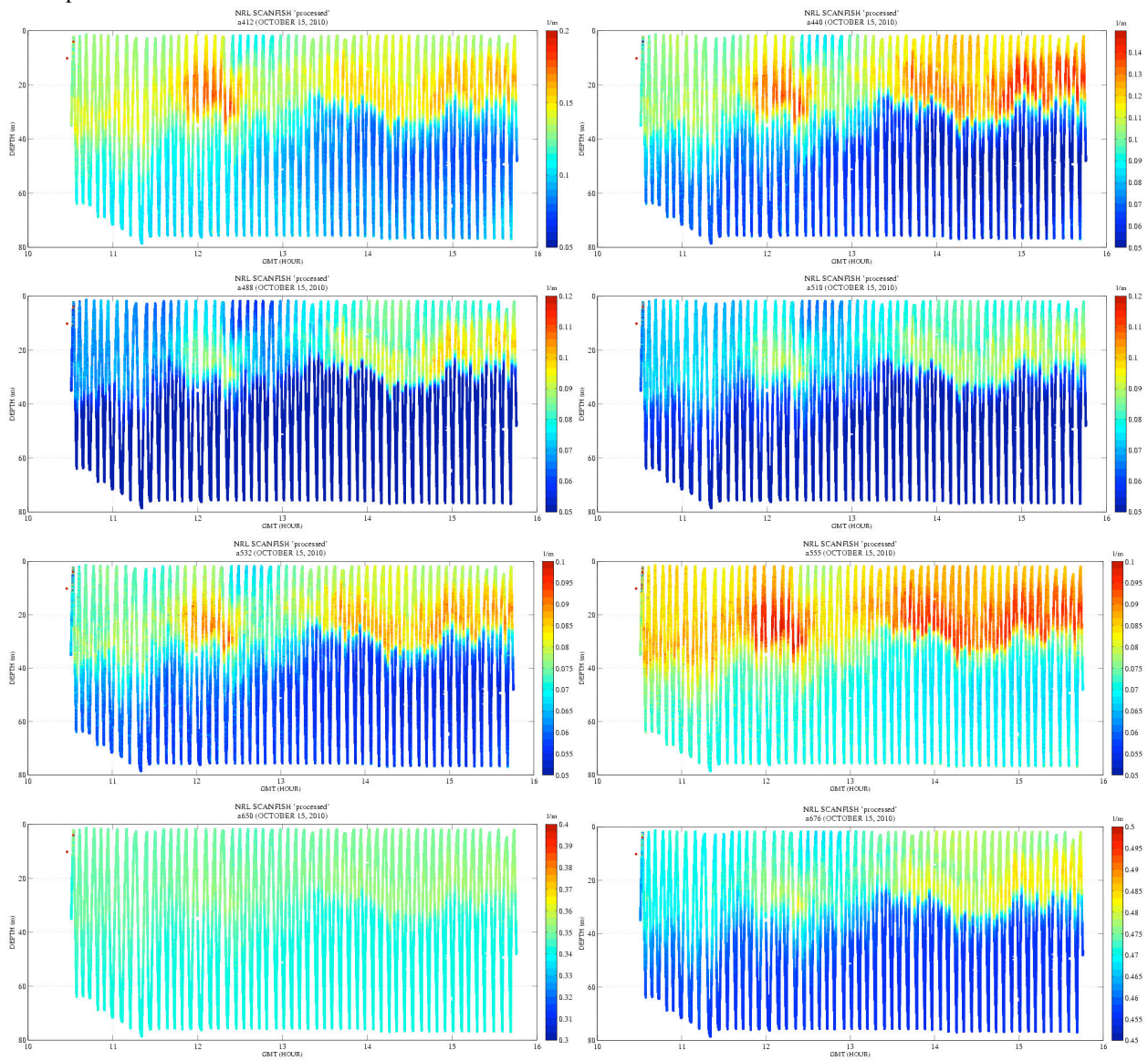
MVSC (532 nm)

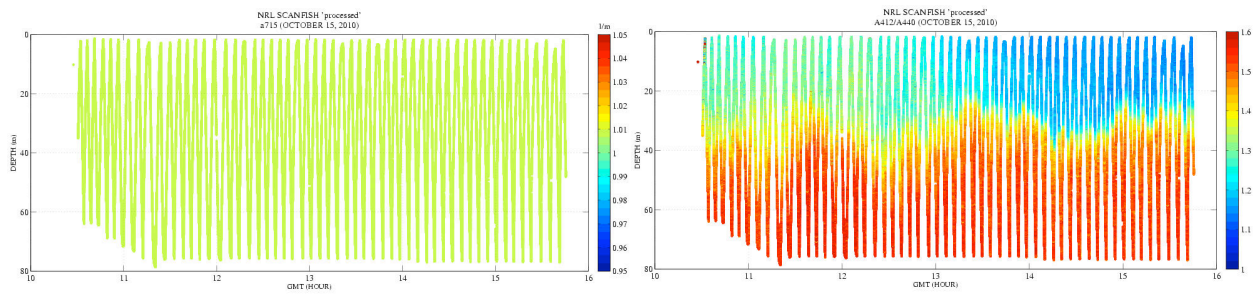


Scanfish Survey

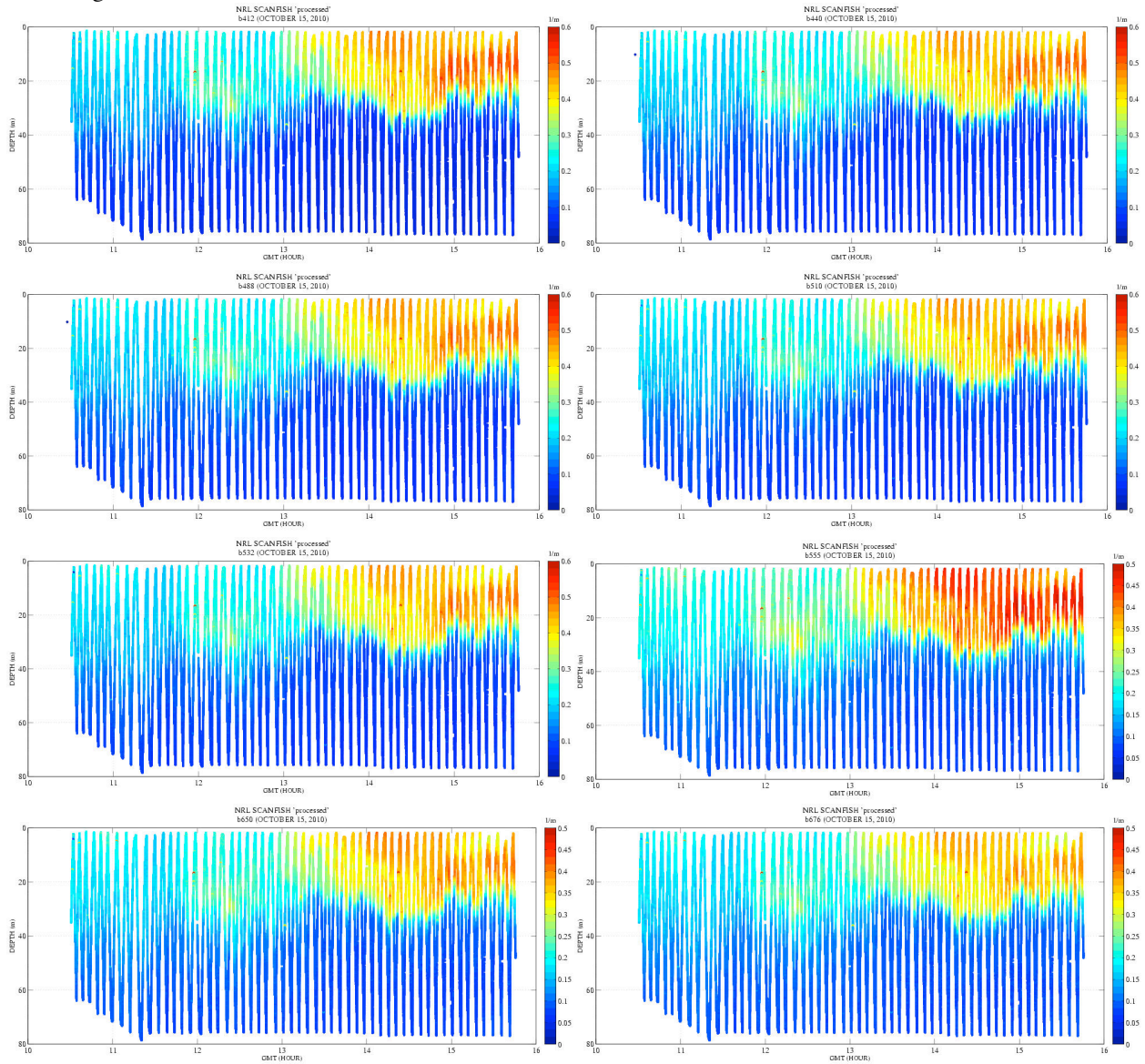


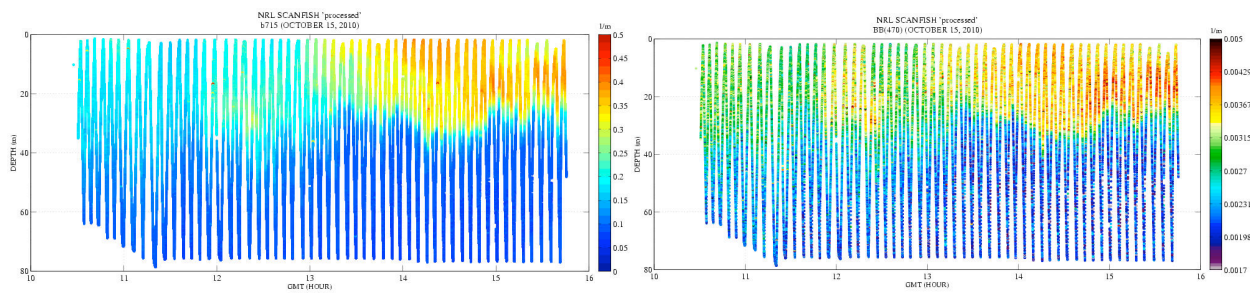
Absorption



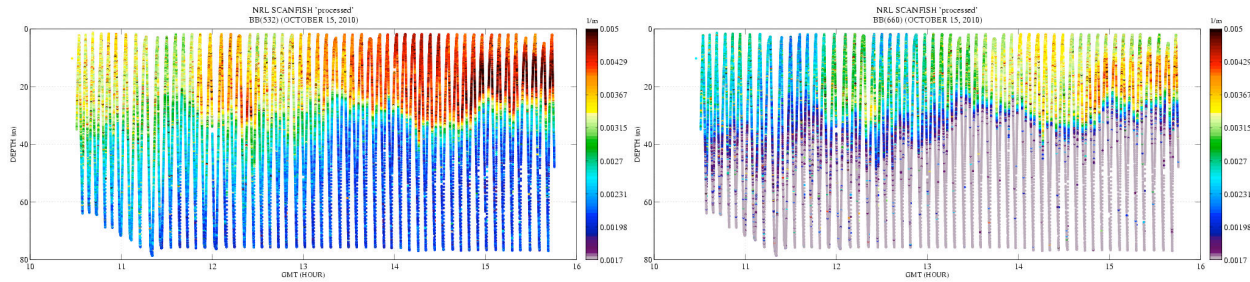


Scattering

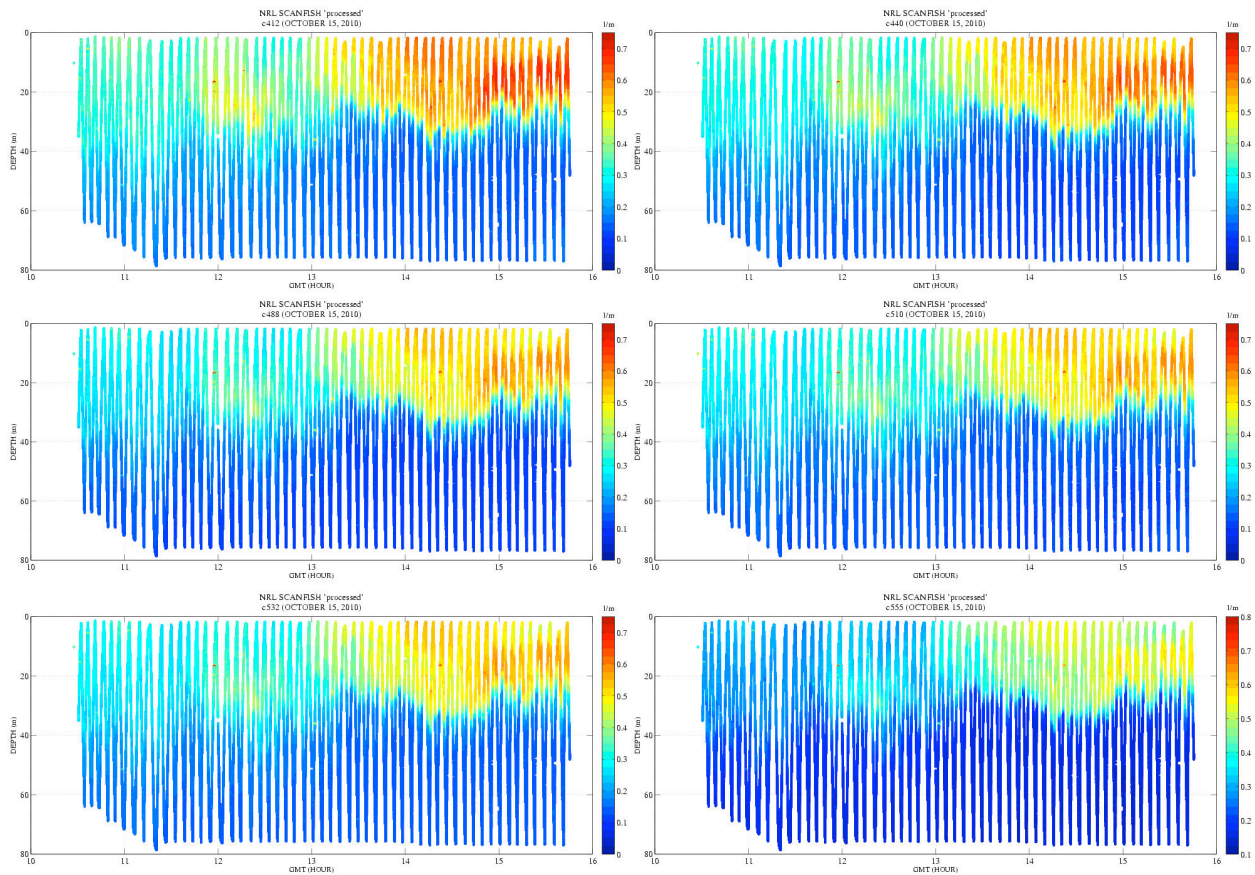


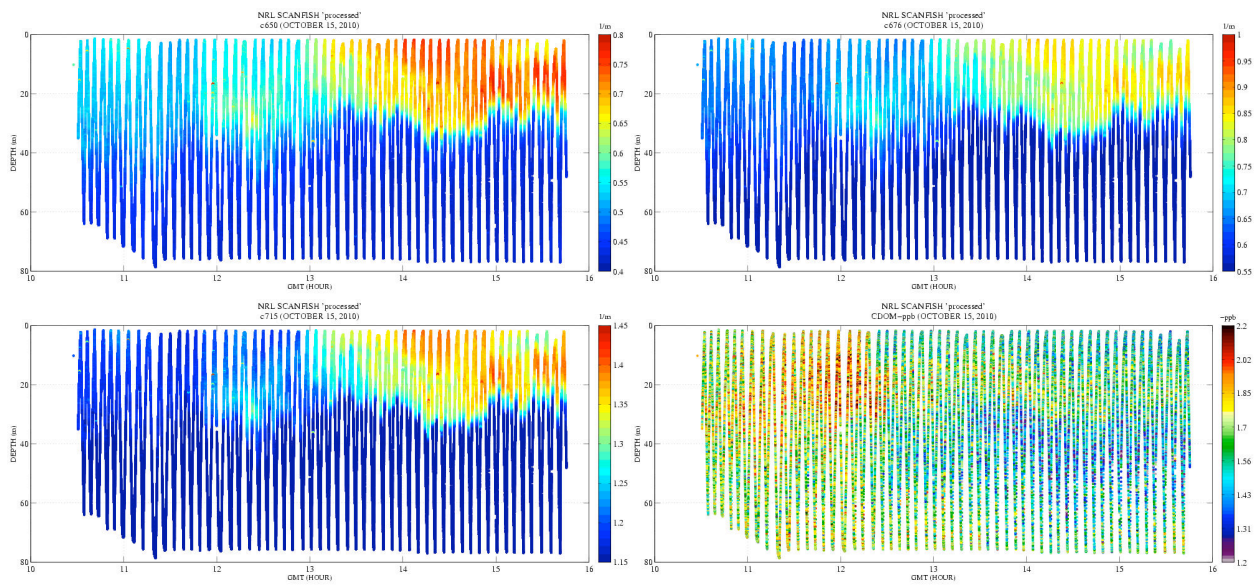


Backscatter

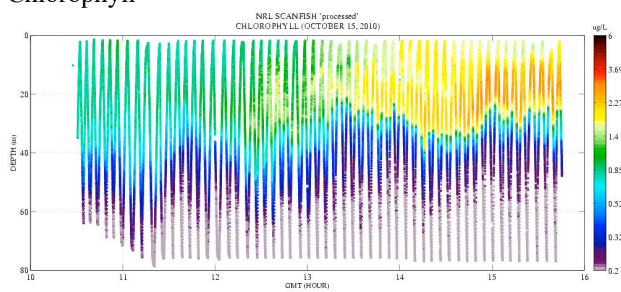


Beam Attenuation

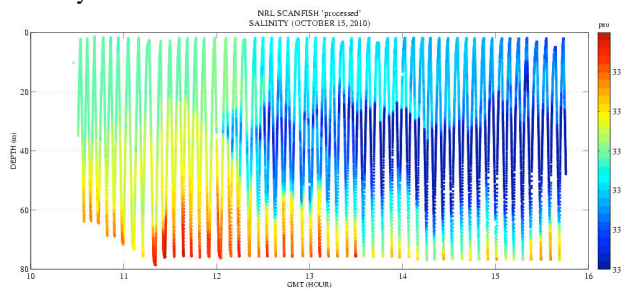




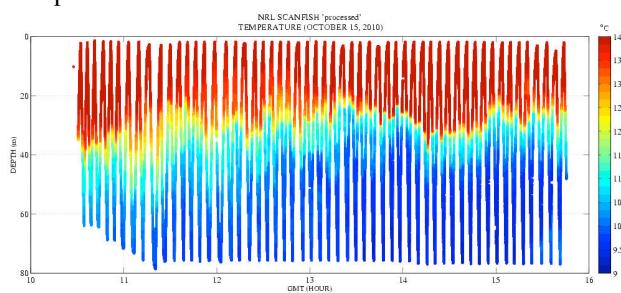
Chlorophyll



Salinity

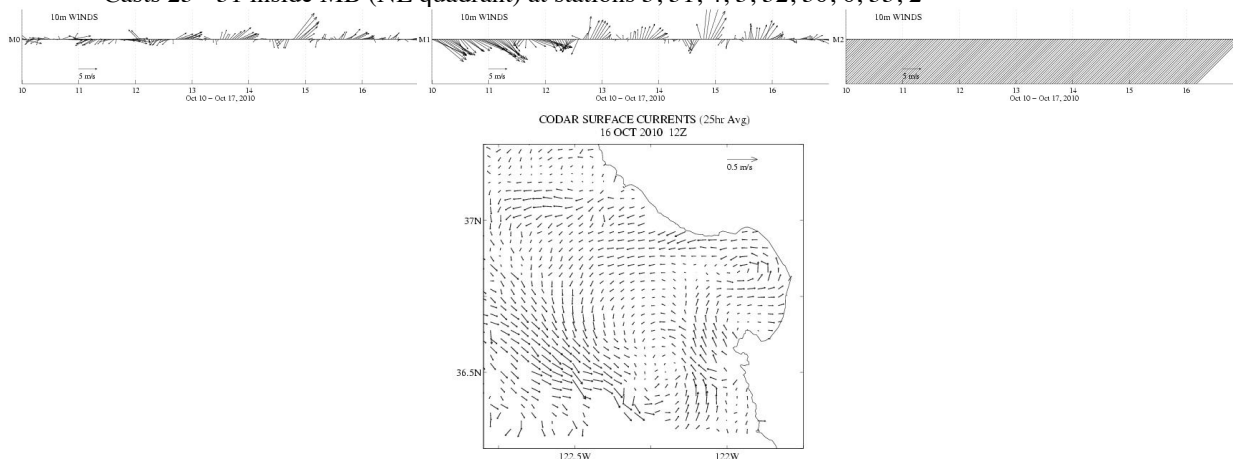


Temperature

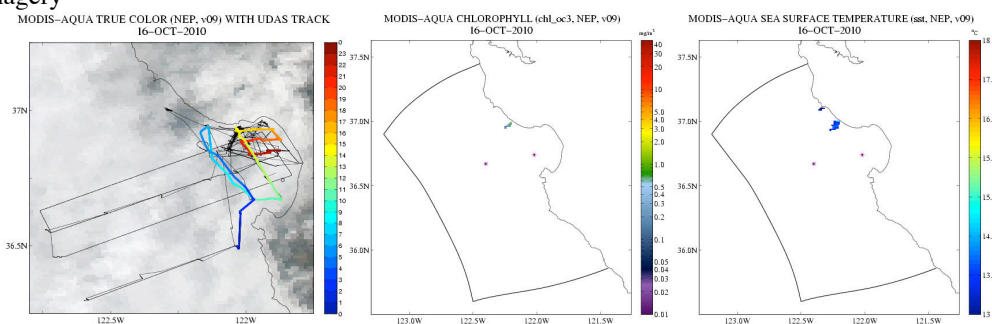


10/16

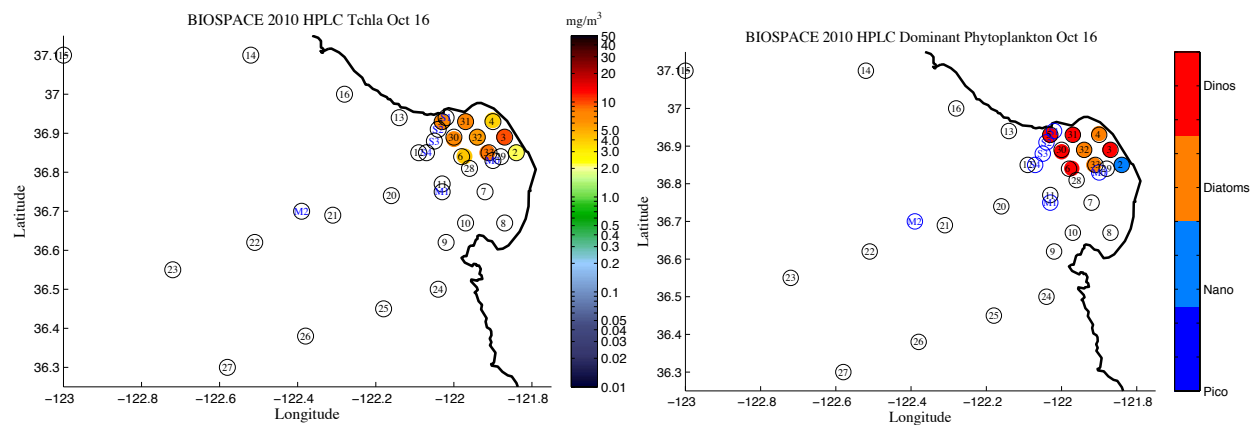
Casts 23 - 31 inside MB (NE quadrant) at stations 5, 31, 4, 3, 32, 30, 6, 33, 2



Satellite Imagery



HPLC

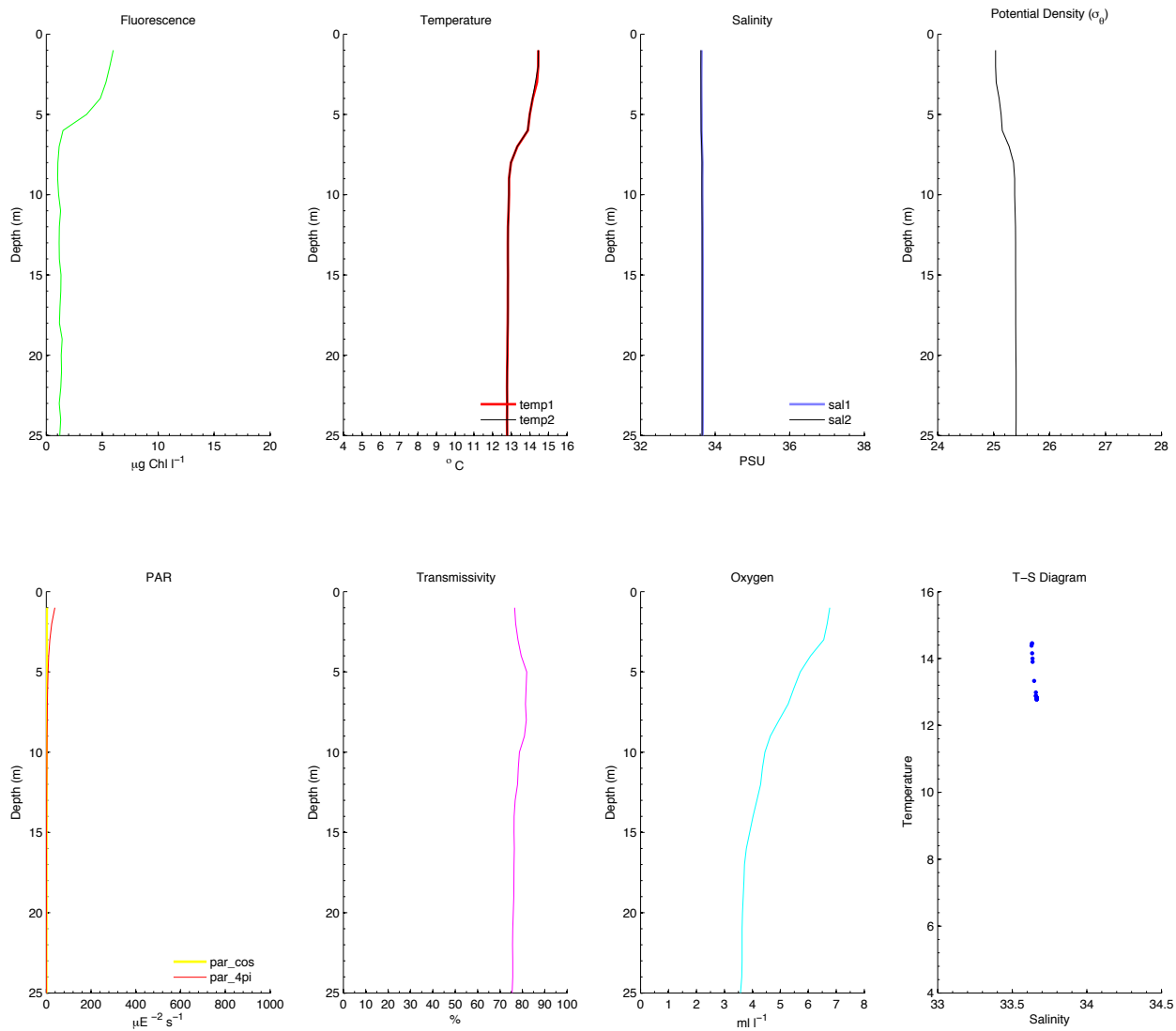


Cast 23 (0748 PDT; [Station BS05](#))

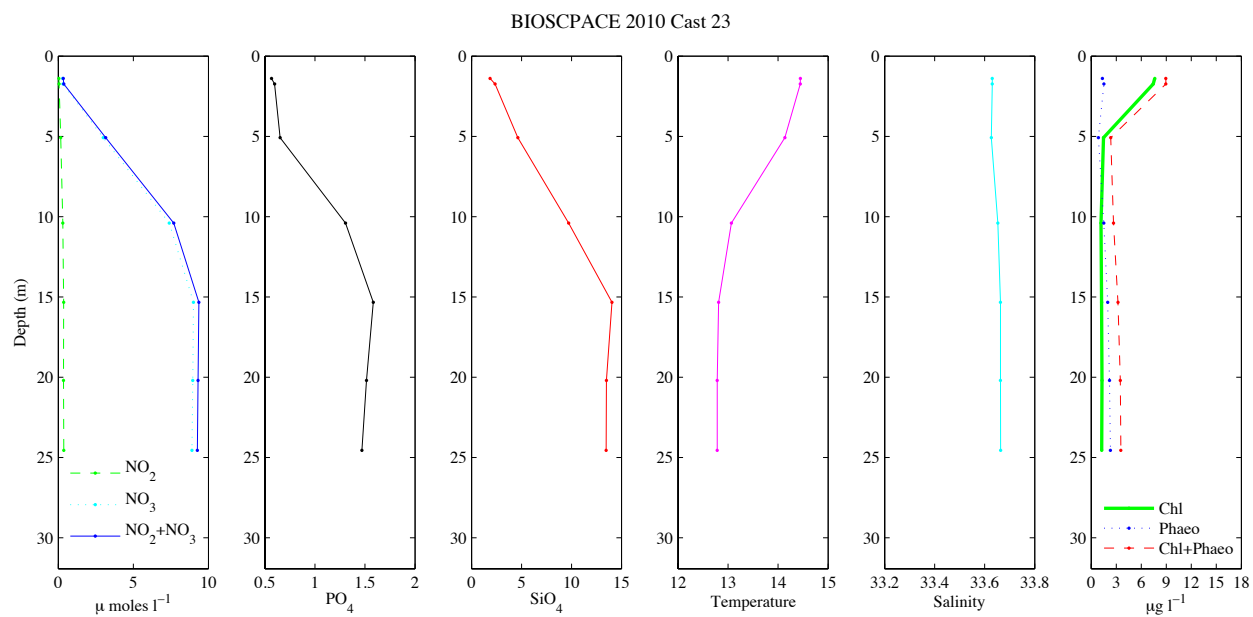
(No TSS from deep bottle: *Prorocentrum* in surface sample (microscope)) (grass, other debris on surface)
(foggy)

CTD

BIOSPACE 2010 Cast 23 (CTD05; 2010-10-16 15:00:00.000 UTC) CTD Downcast Data (Calibrated)

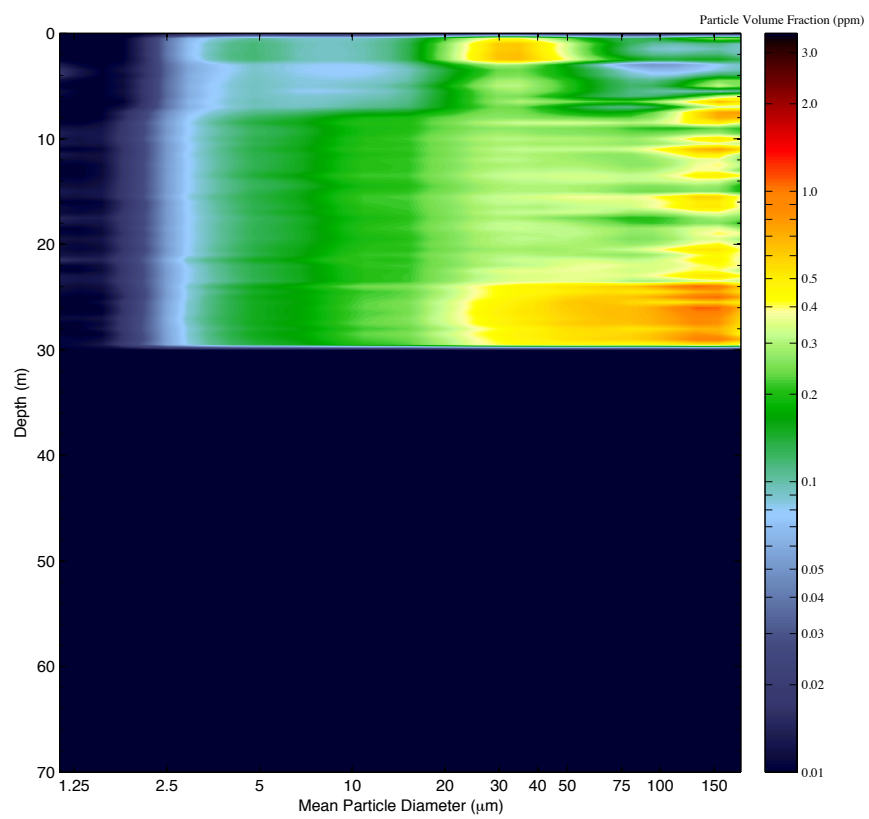


Bottle Nutrients and Chlorophyll

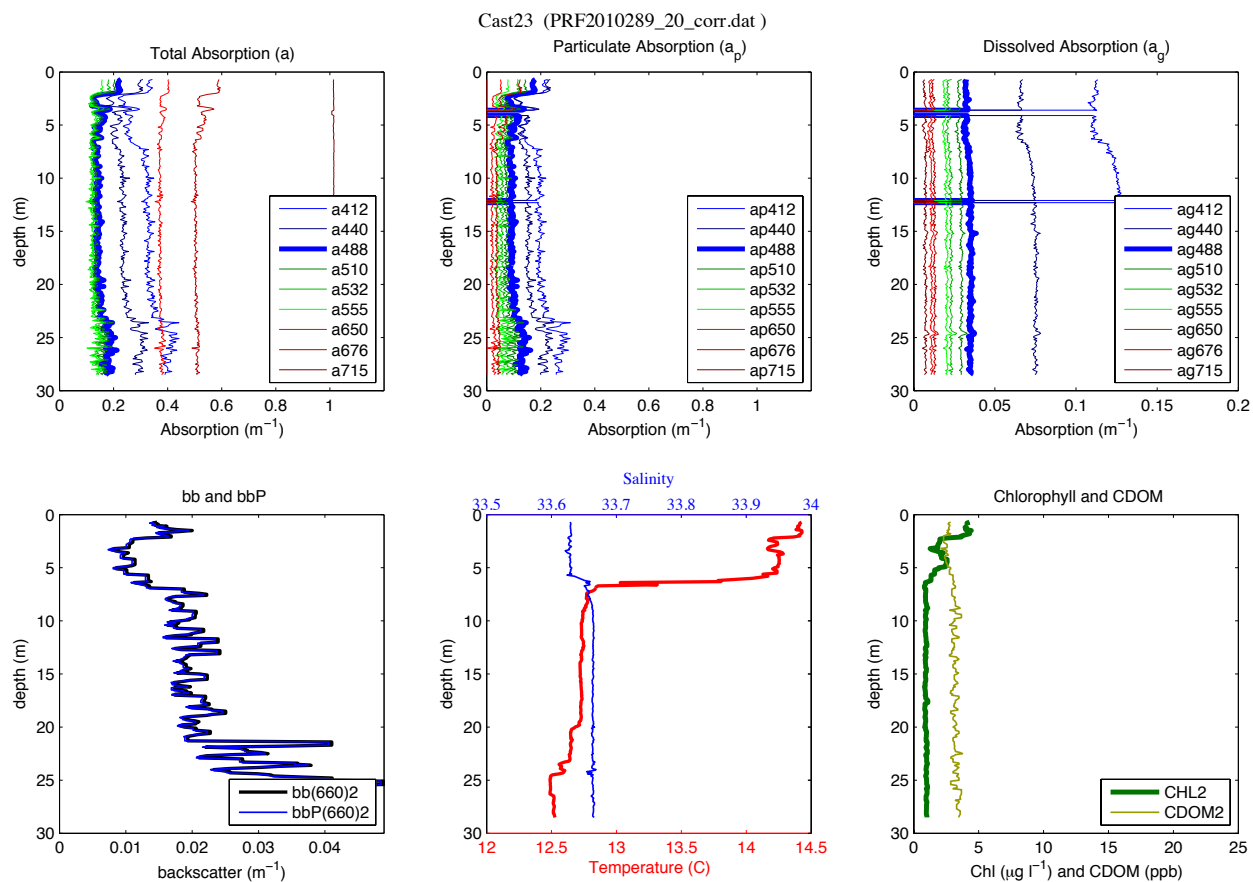


LISST

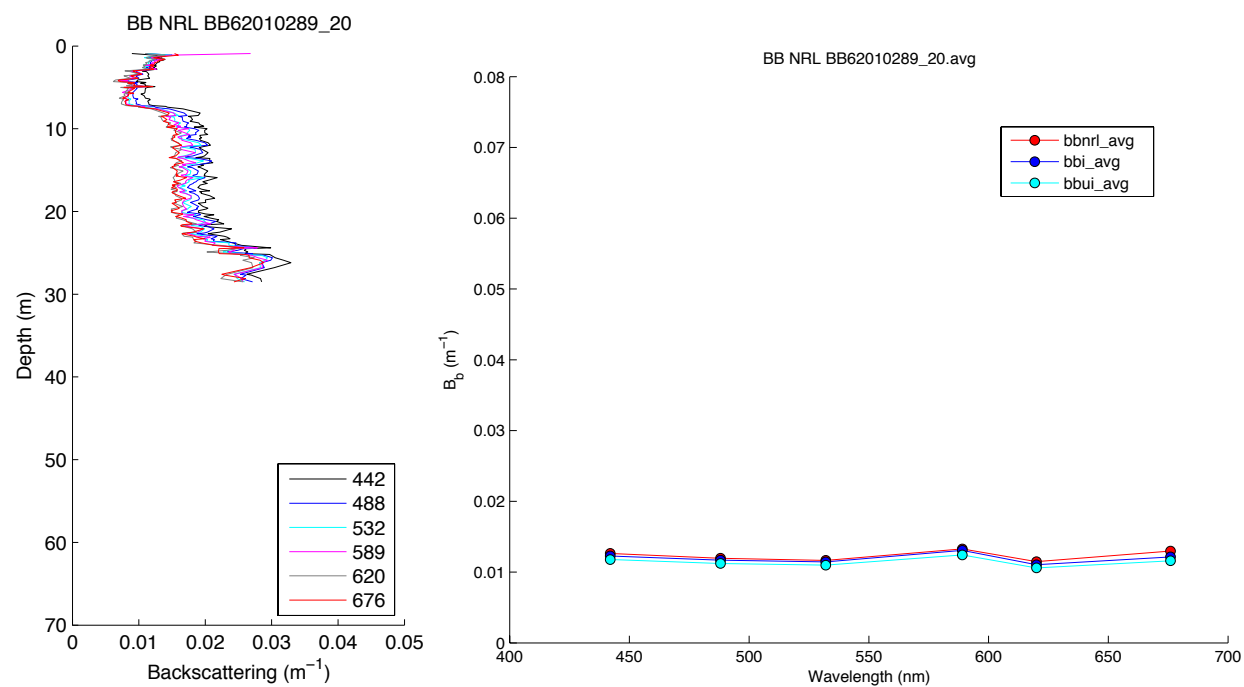
LISST – Cast 23



Optics Profile Package

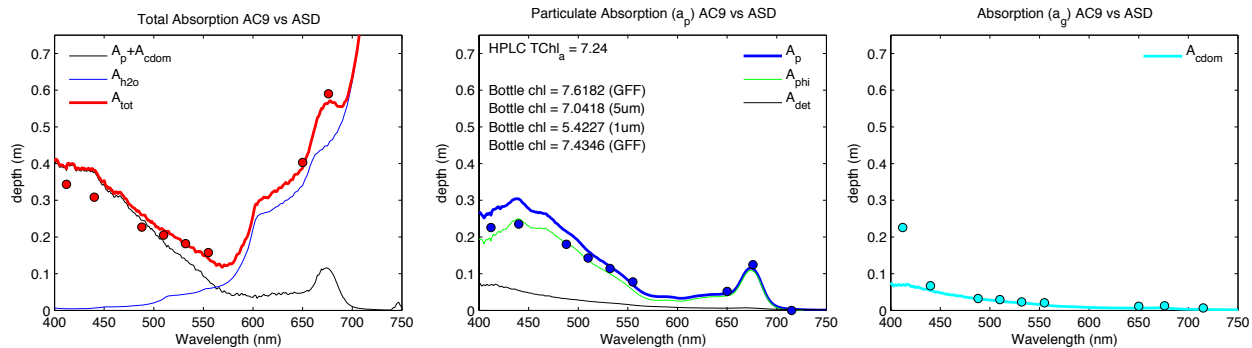


HydroScat

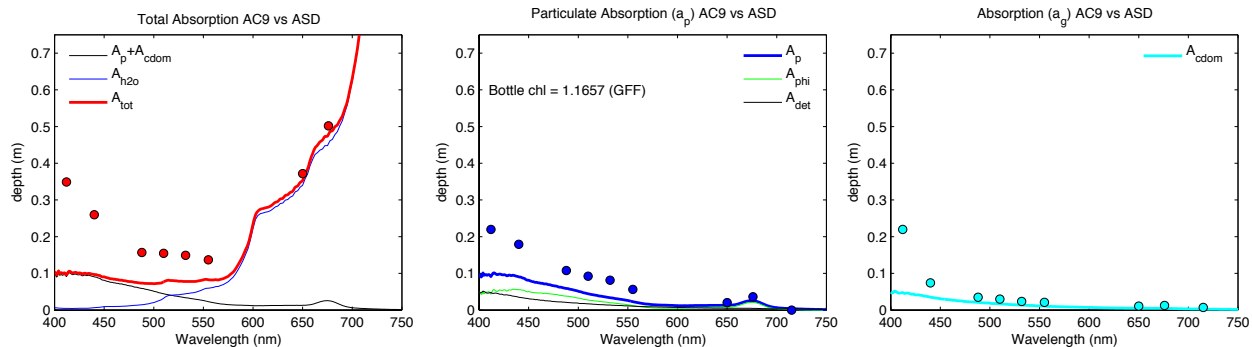


Filter Pad Absorption (w/ AC9)

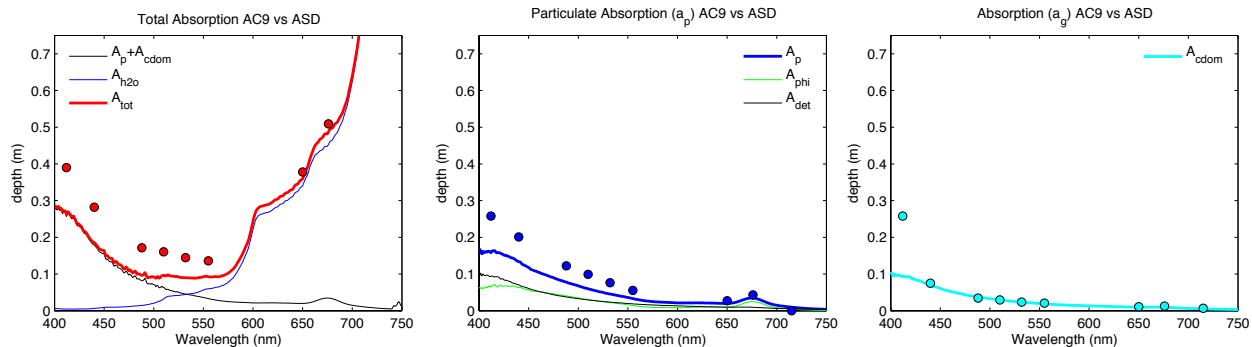
AC9 vs ASD Cast 23 – 0m (PRF2010289_20_corr.dat) CTD 09



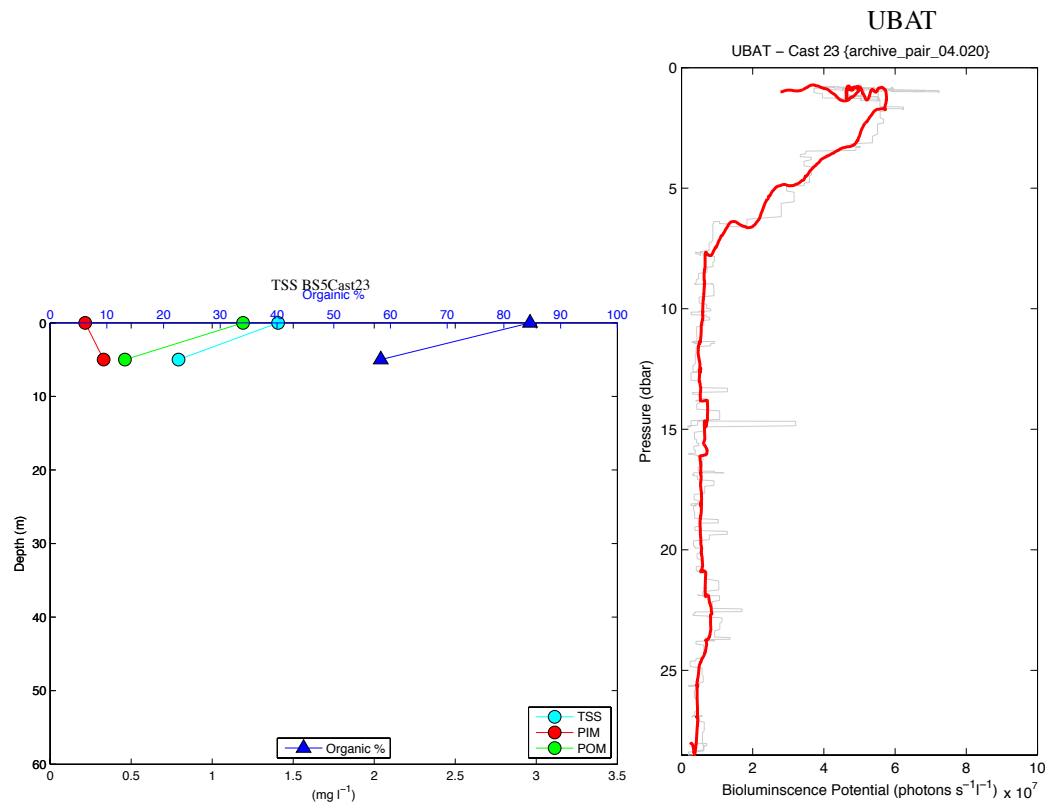
AC9 vs ASD Cast 23 – 10m (PRF2010289_20_corr.dat) CTD 09



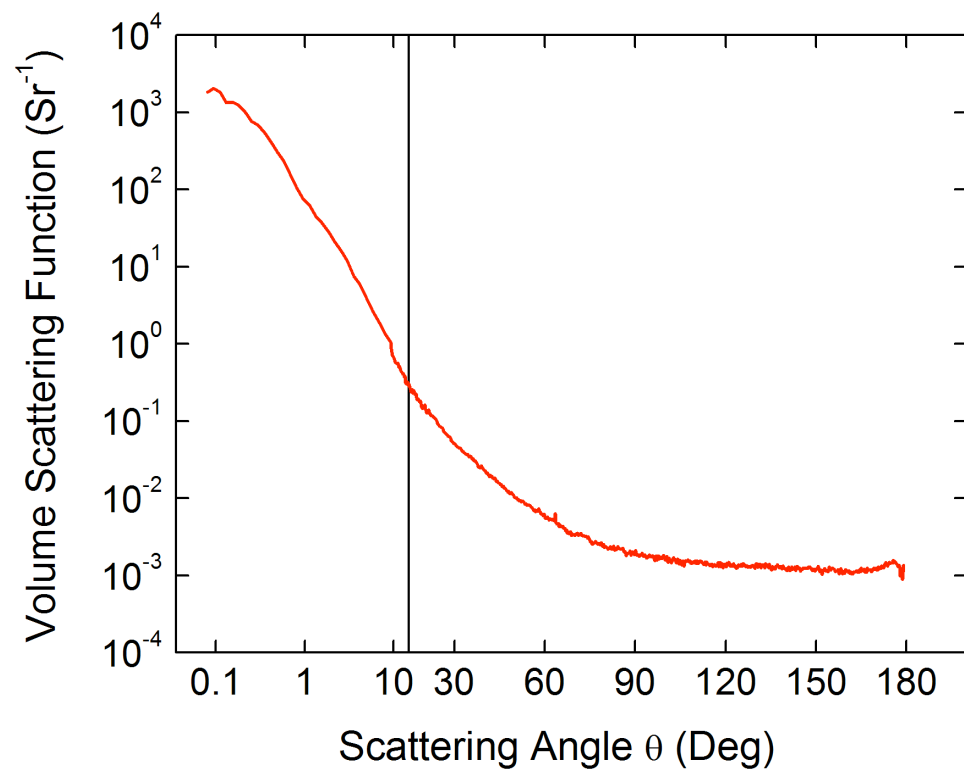
AC9 vs ASD Cast 23 – 30m (PRF2010289_20_corr.dat) CTD 09



TSS



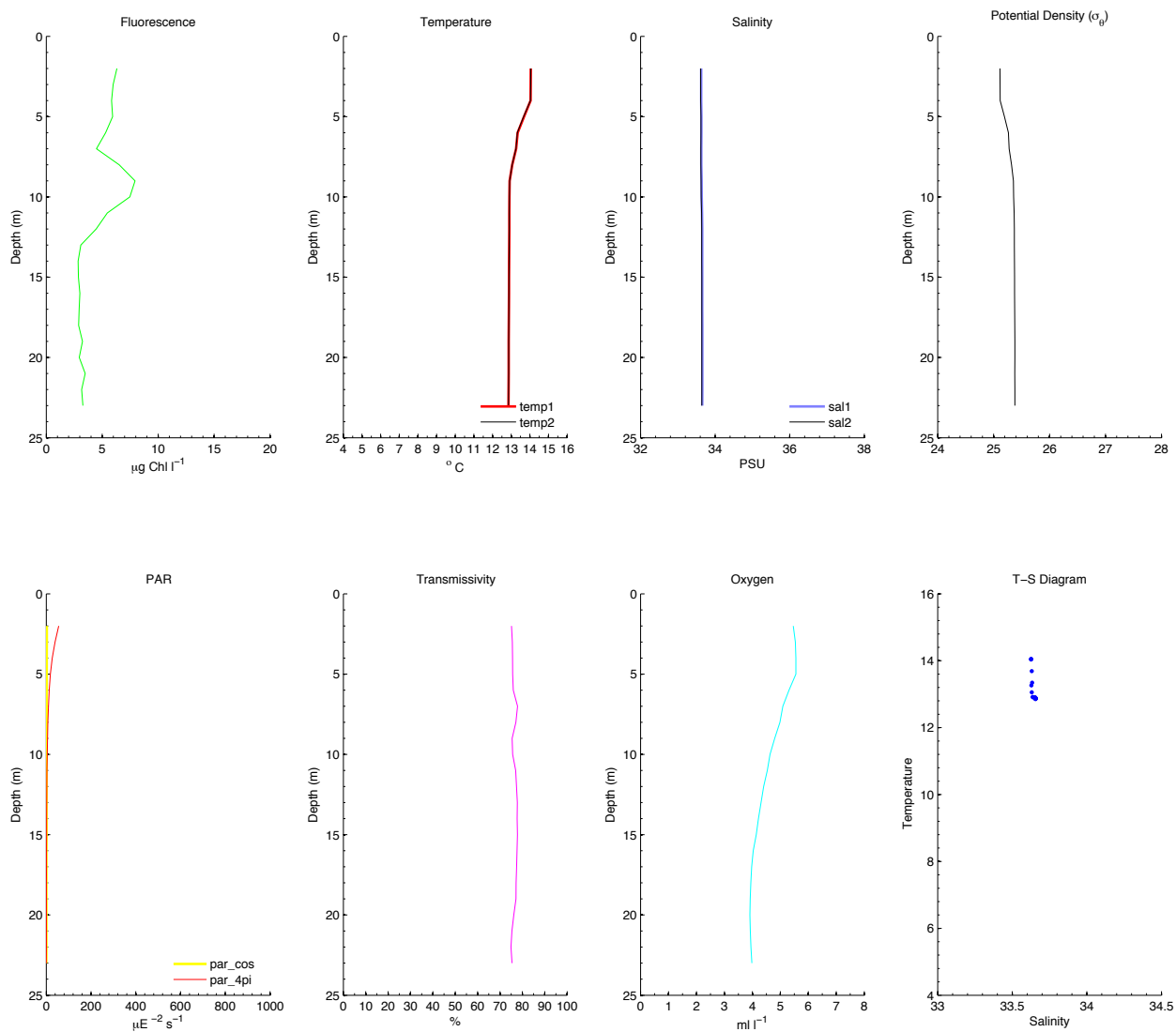
MVSC (532 nm)



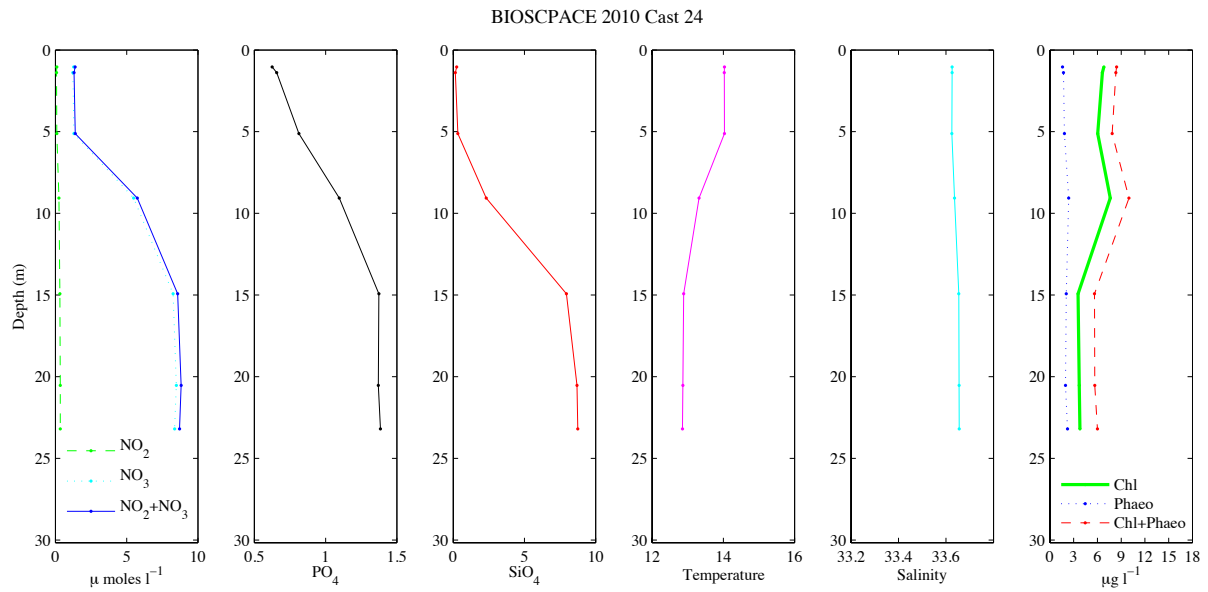
Cast 24 (0900 PDT; [Station BS31](#))
(foggy)

CTD

BIOSPACE 2010 Cast 24 (CTD31; 2010-10-16 16:00:00.000 UTC) CTD Downcast Data (Calibrated)

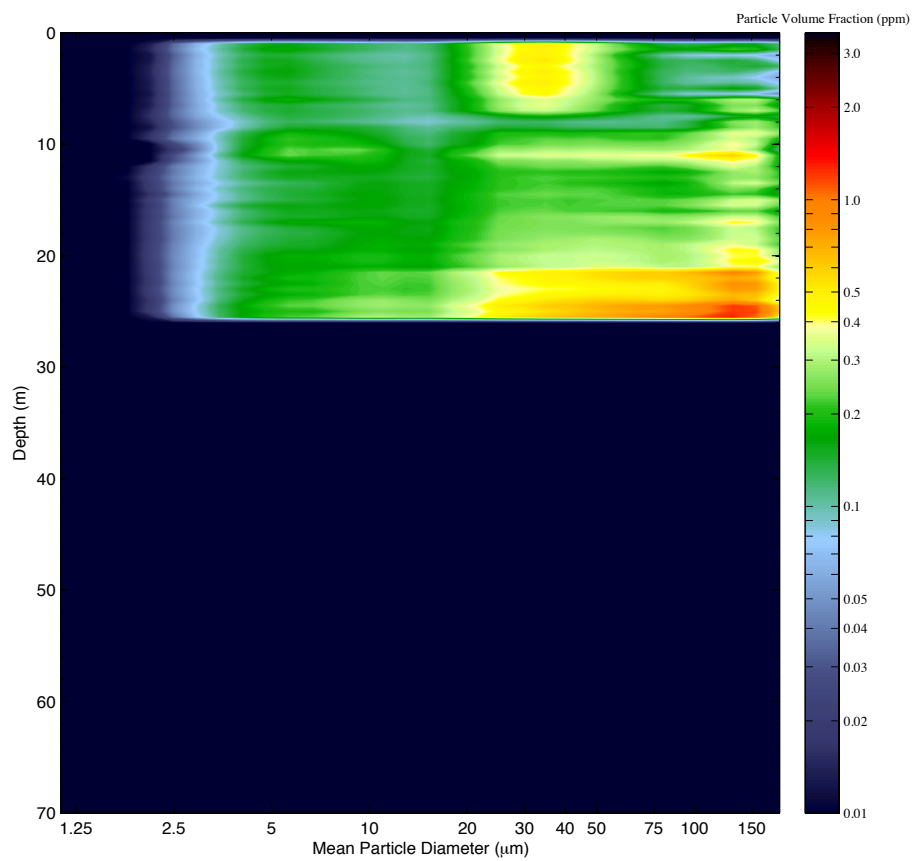


Bottle Nutrients and Chlorophyll

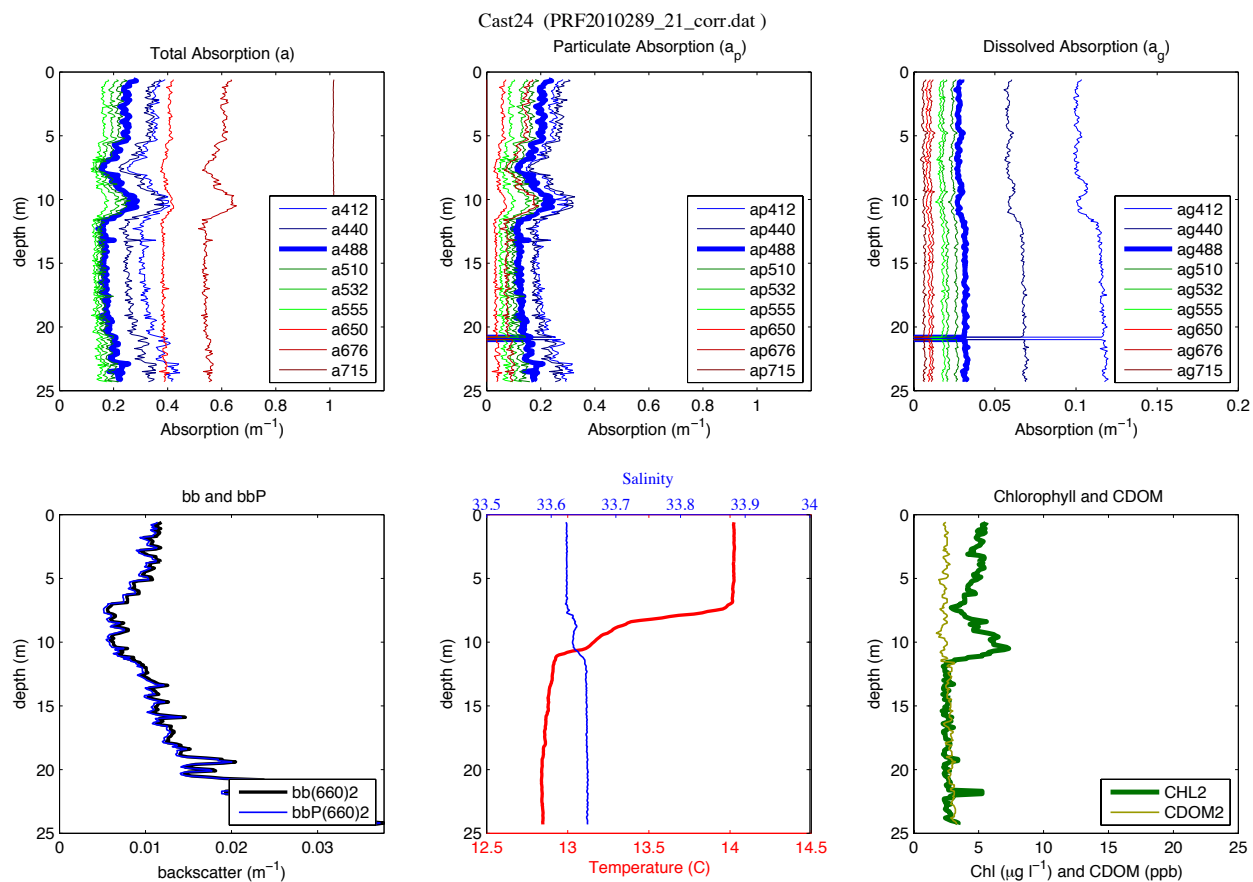


LISST

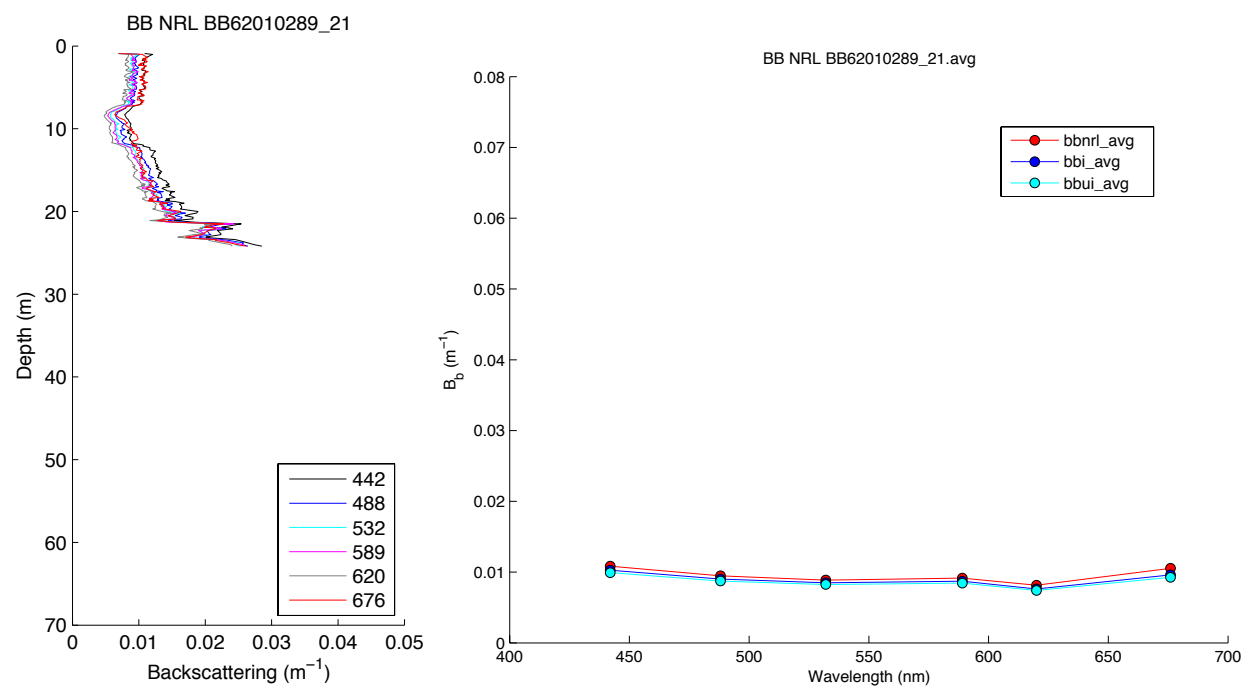
LISST – Cast 24



Optics Profile Package

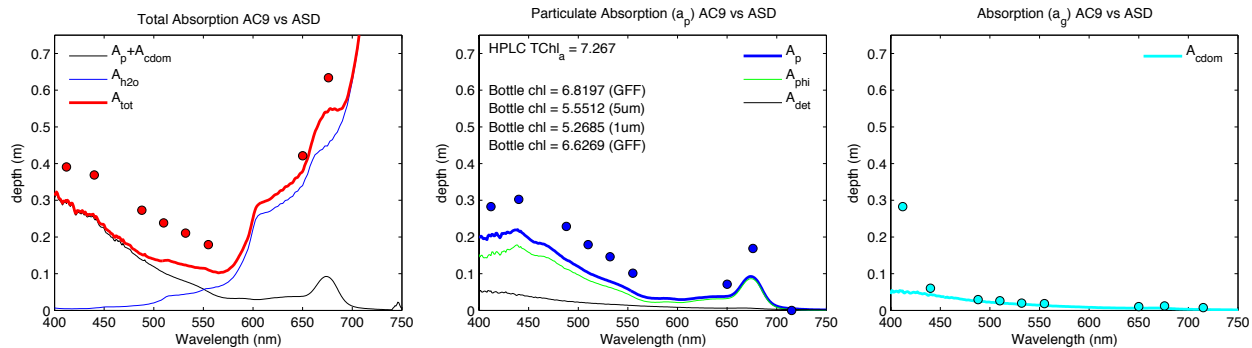


HydroScat

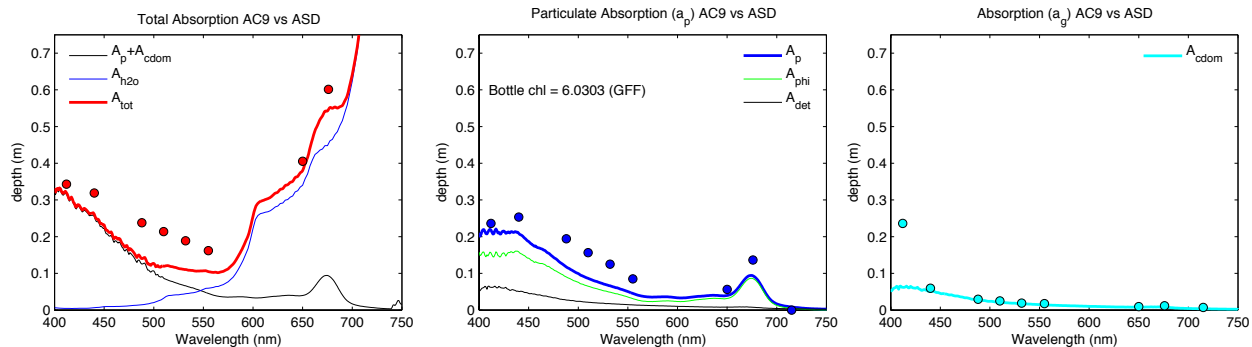


Filter Pad Absorption (w/ AC9)

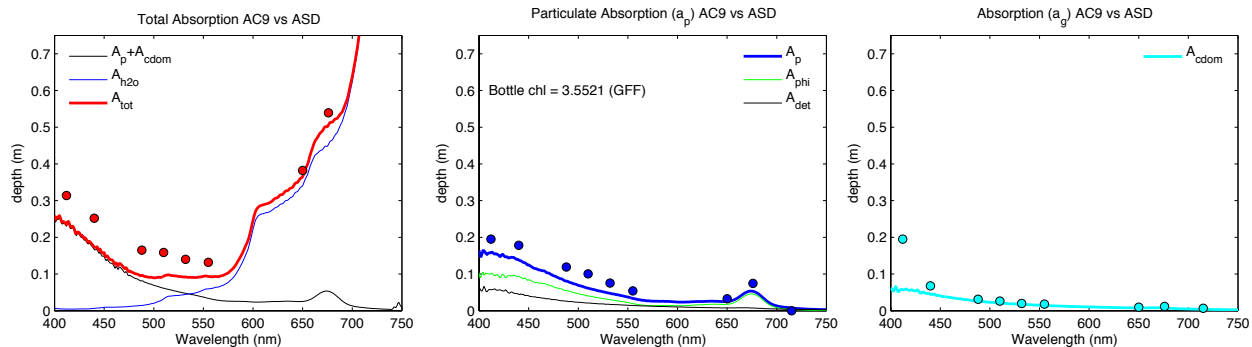
AC9 vs ASD Cast 24 – 0m (PRF2010289_21_corr.dat) CTD 10

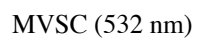


AC9 vs ASD Cast 24 – 5m (PRF2010289_21_corr.dat) CTD 10



AC9 vs ASD Cast 24 – 15m (PRF2010289_21_corr.dat) CTD 10

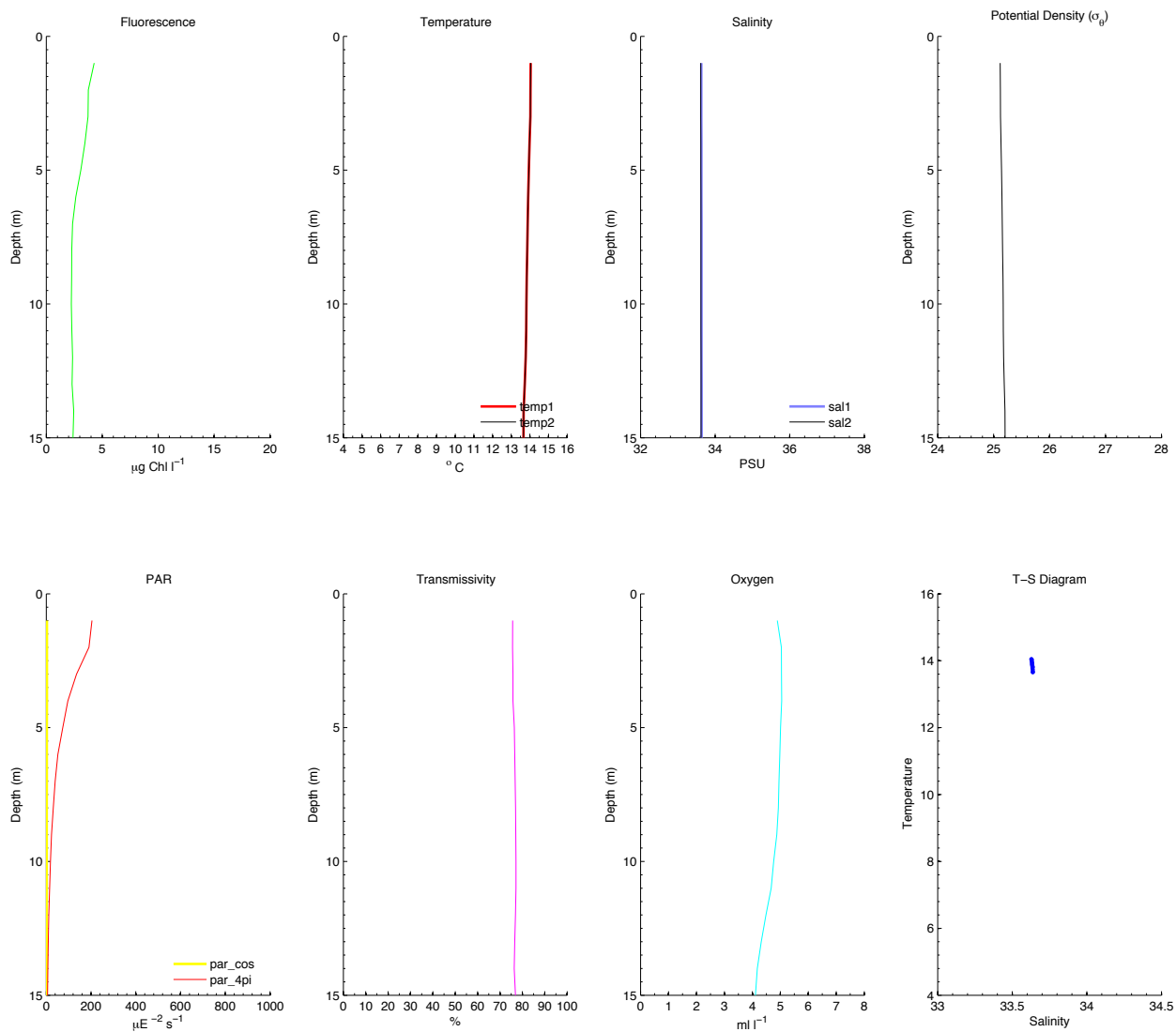




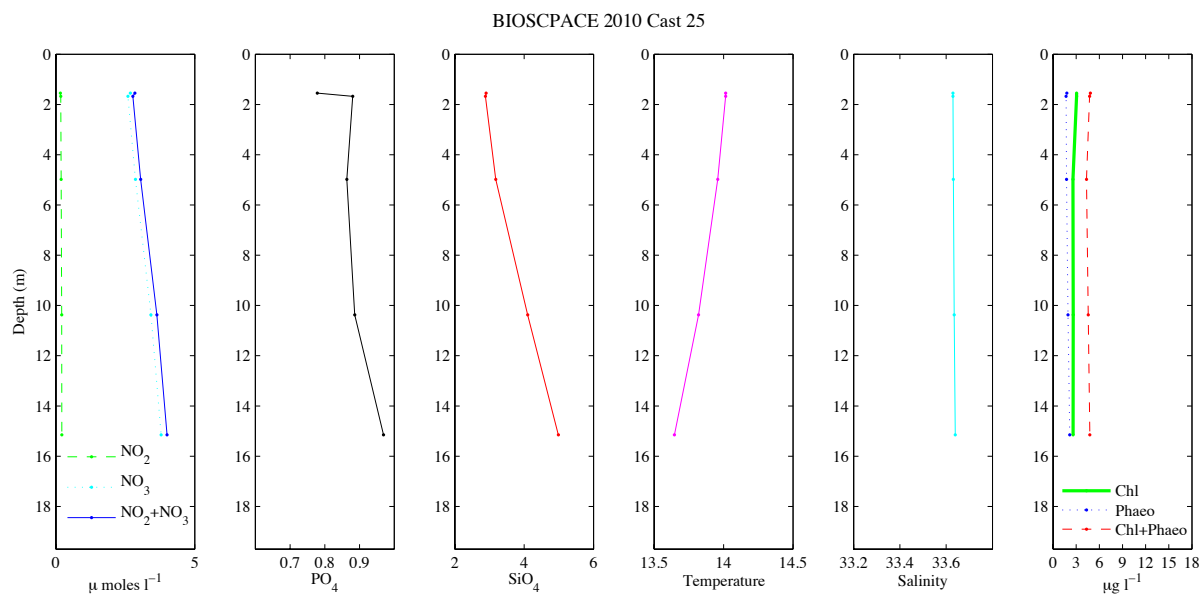
Cast 25 (1000 PDT; [Station BS04](#))
(foggy)

CTD

BIOSPACE 2010 Cast 25 (CTD04; 2010-10-16 16:59:00.000 UTC) CTD Downcast Data (Calibrated)

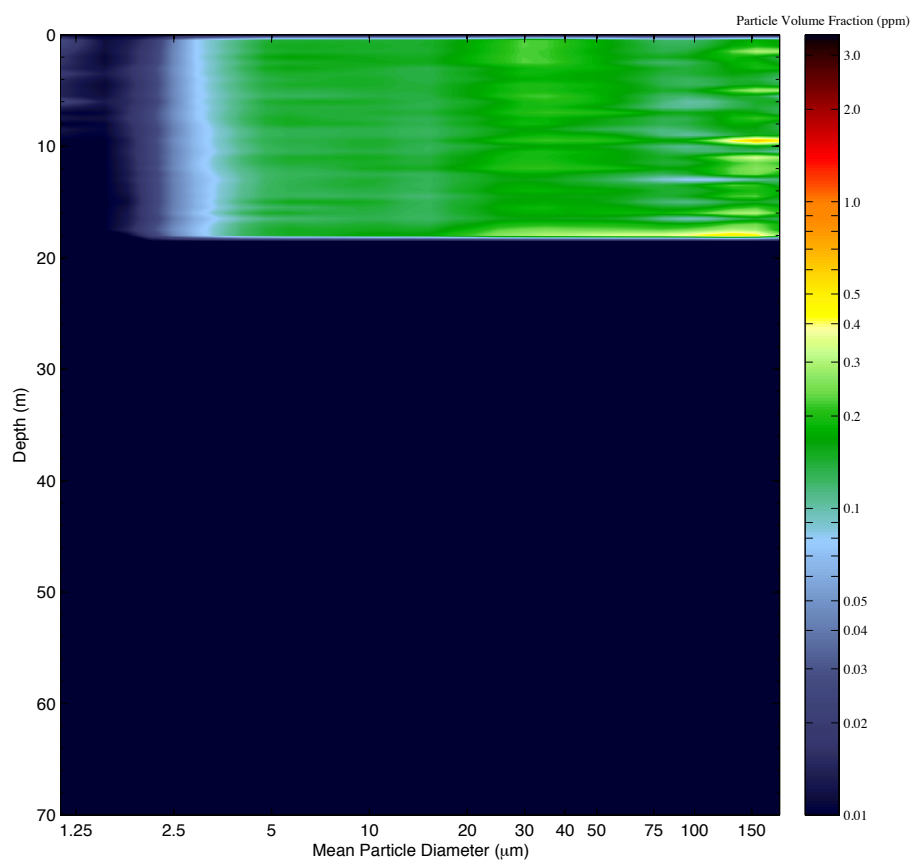


Bottle Nutrients and Chlorophyll

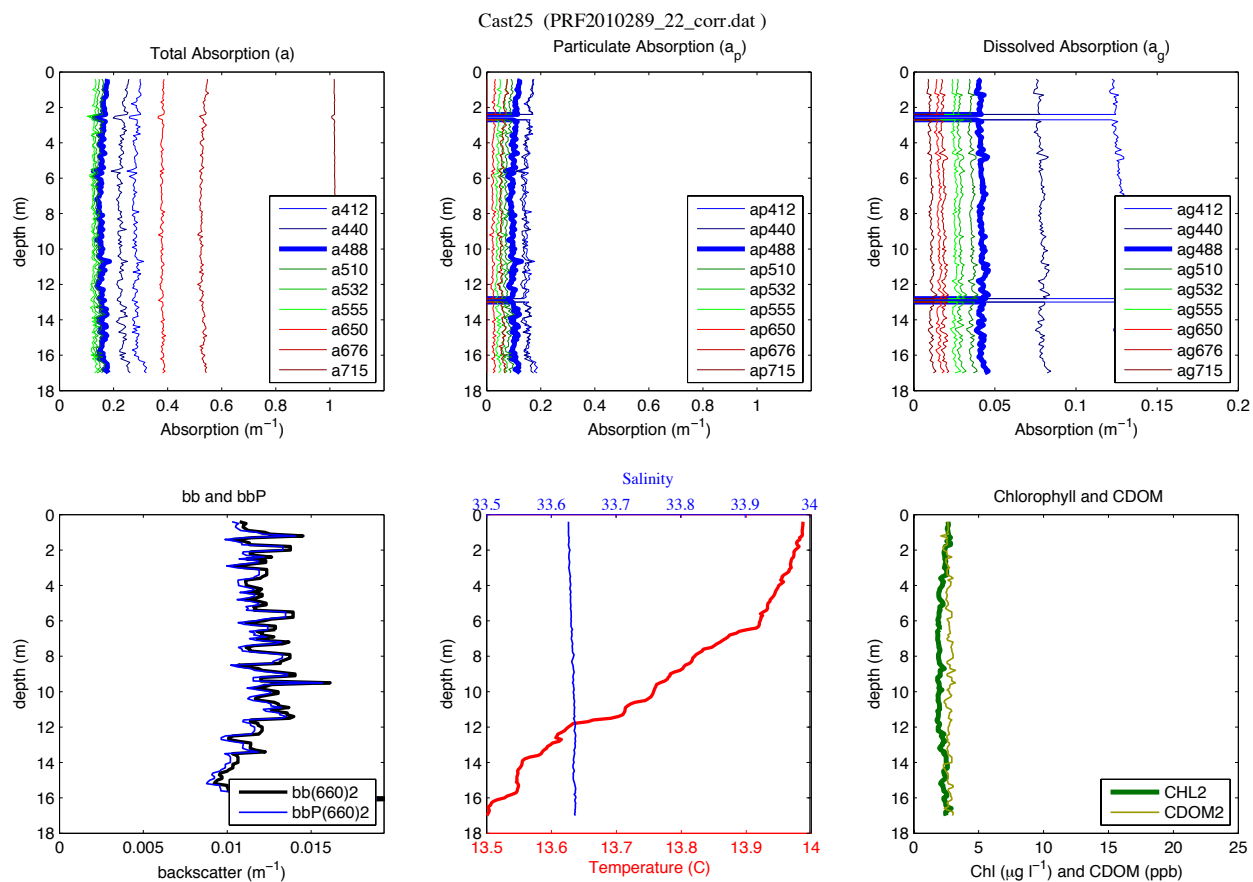


LISST

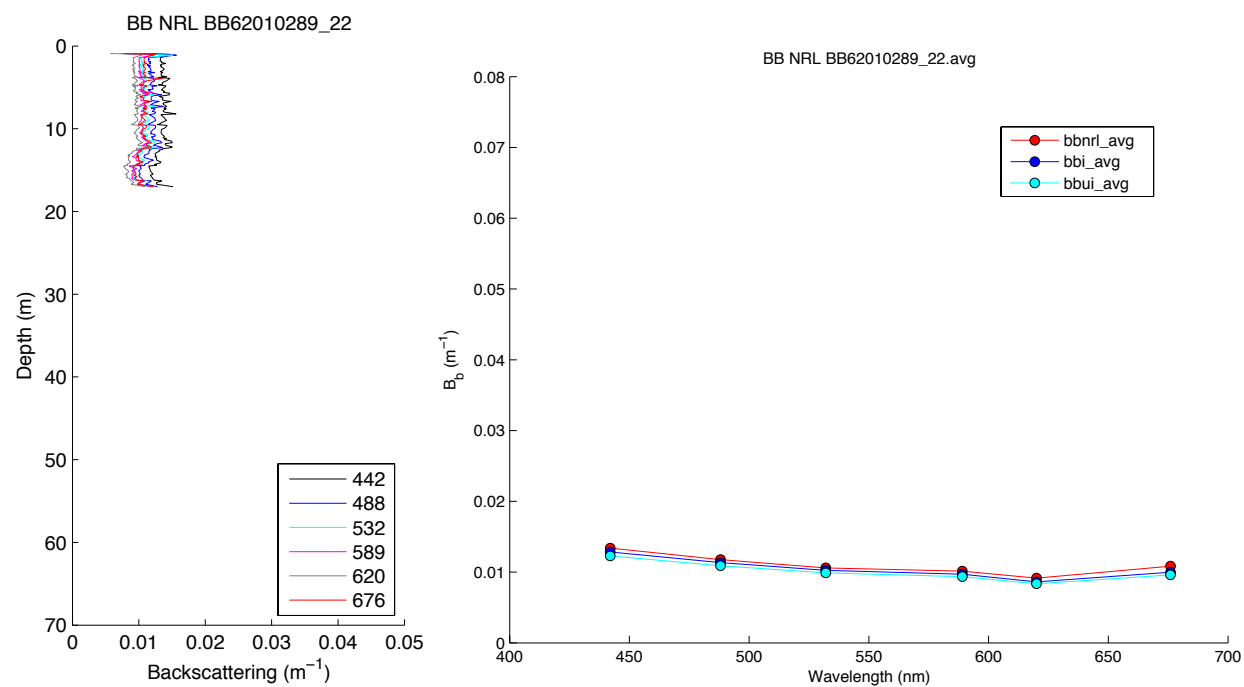
LISST – Cast 25



Optics Profile Package

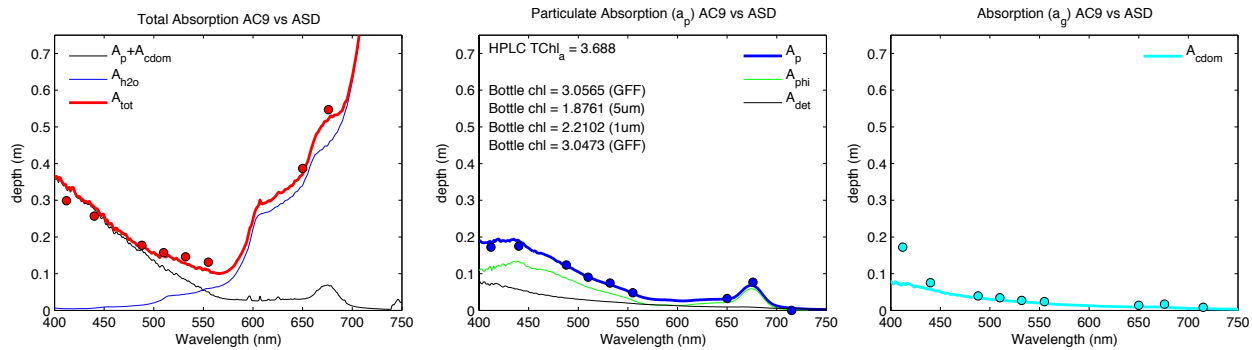


HydroScat

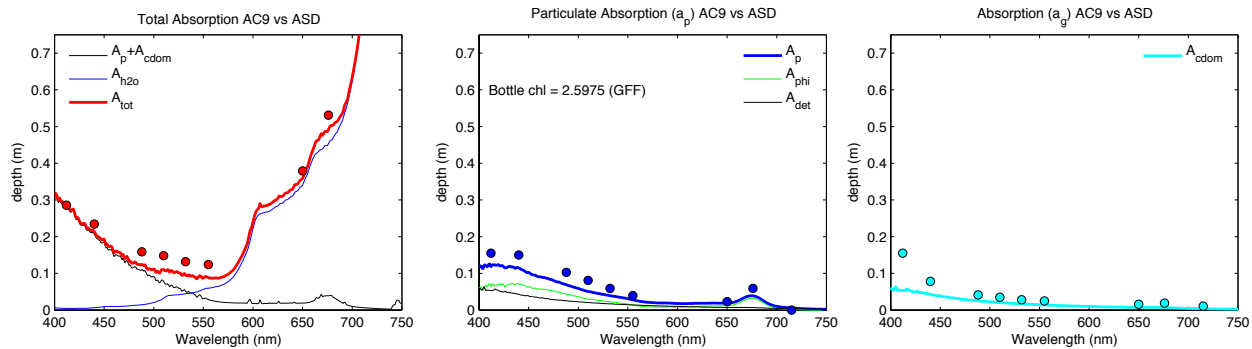


Filter Pad Absorption (w/ AC9)

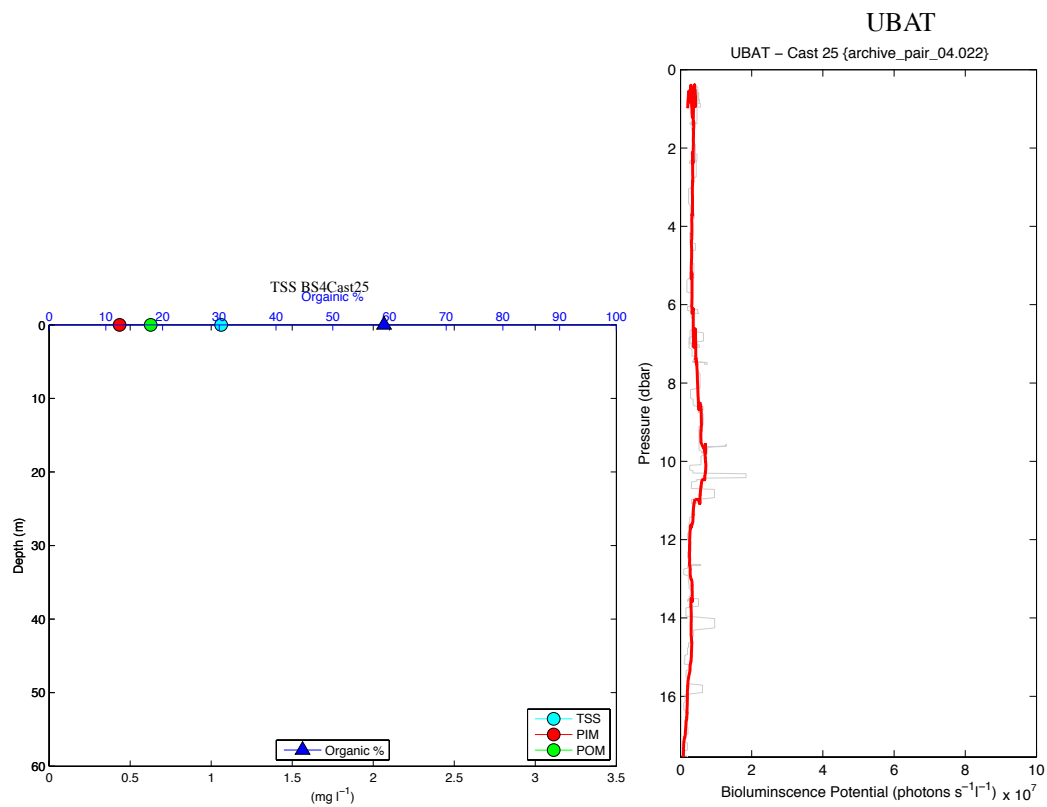
AC9 vs ASD Cast 25 – 0m (PRF2010289_22_corr.dat) CTD 05



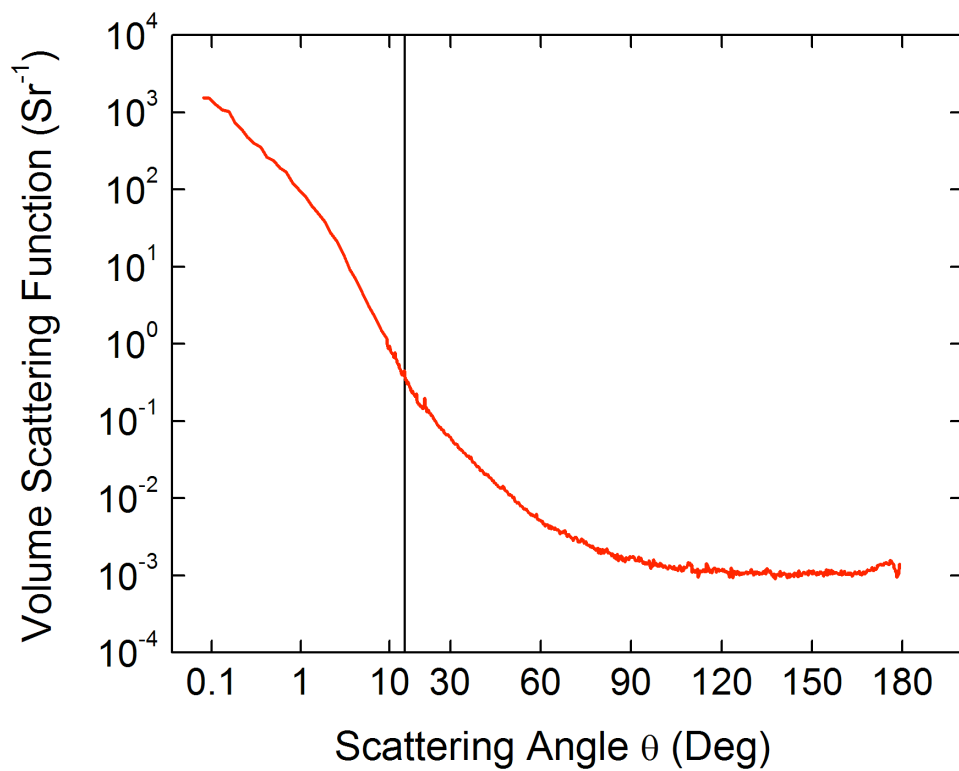
AC9 vs ASD Cast 25 – 15m (PRF2010289_22_corr.dat) CTD 05



TSS



MVSC (532 nm)

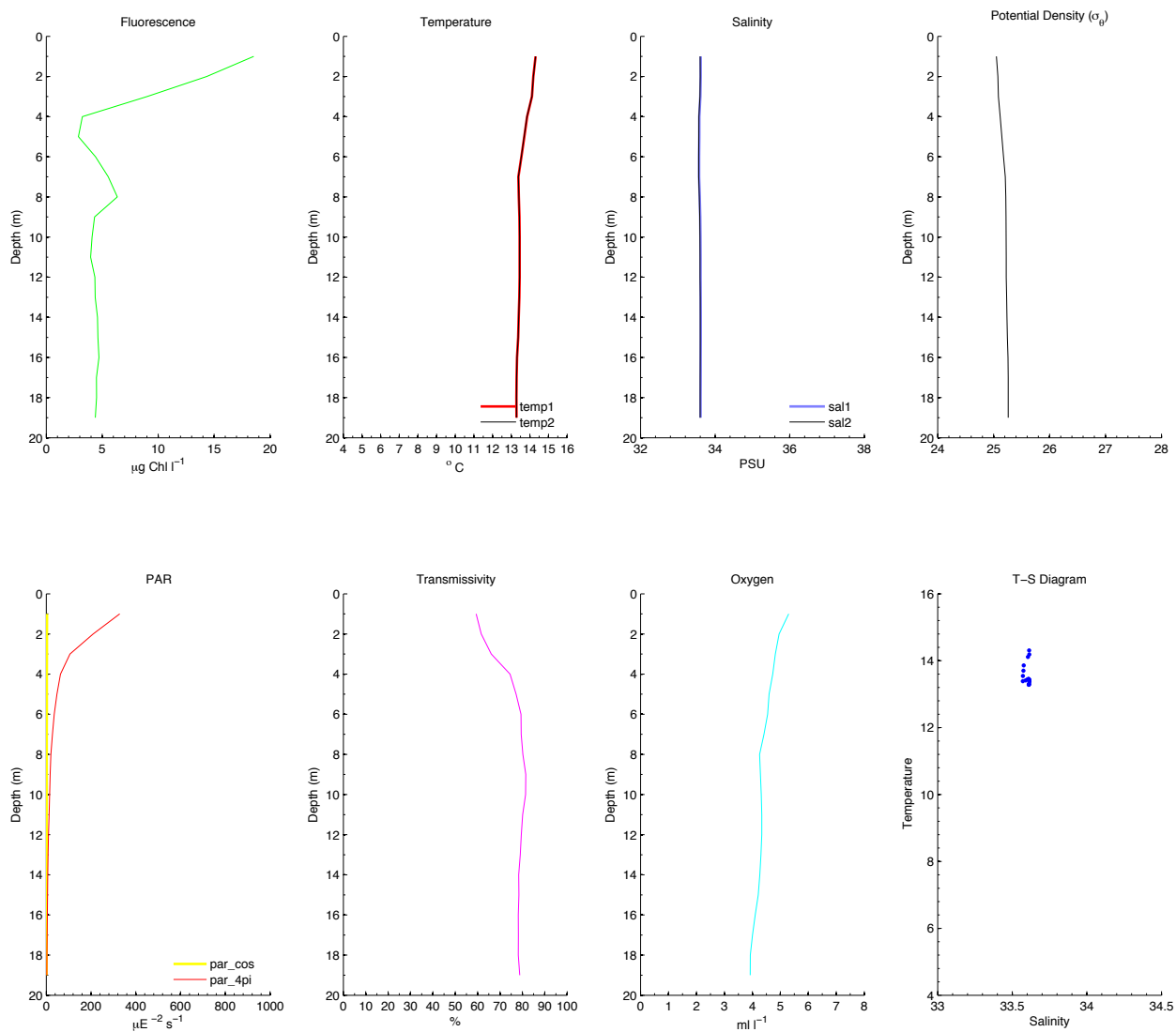


Cast 26 (1050 PDT; [Station BS03](#))

(water color brown + mixed dinos) (foggy)

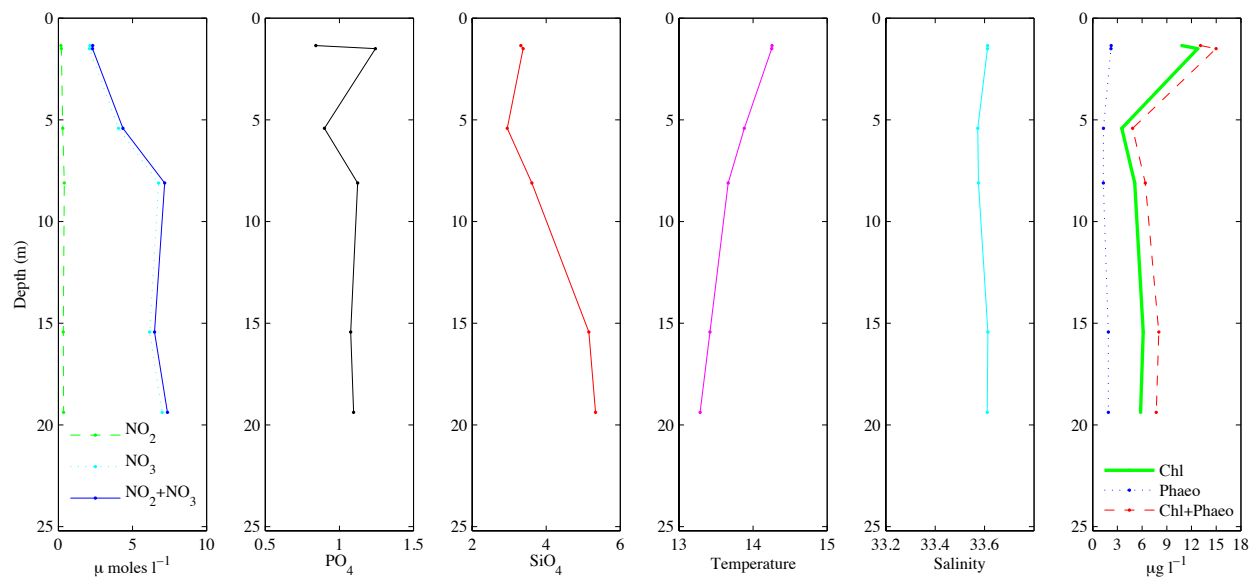
CTD

BIOSPACE 2010 Cast 26 (CTD03; 2010-10-16 17:48:00.000 UTC) CTD Downcast Data (Calibrated)



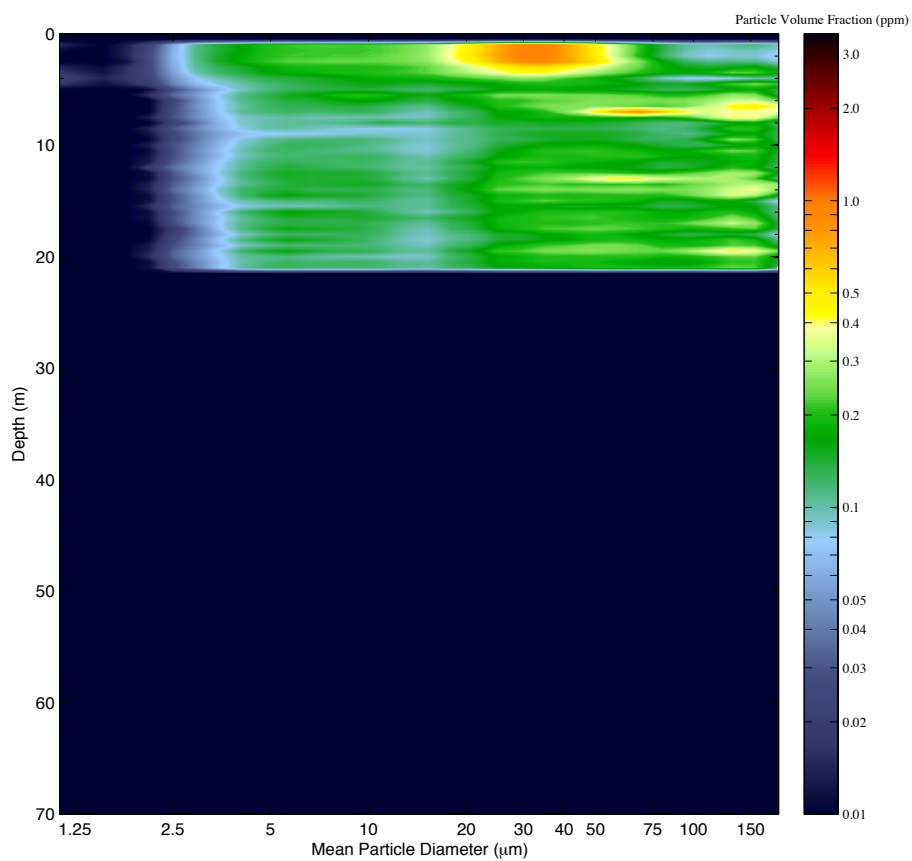
Bottle Nutrients and Chlorophyll

BIOSPACE 2010 Cast 26

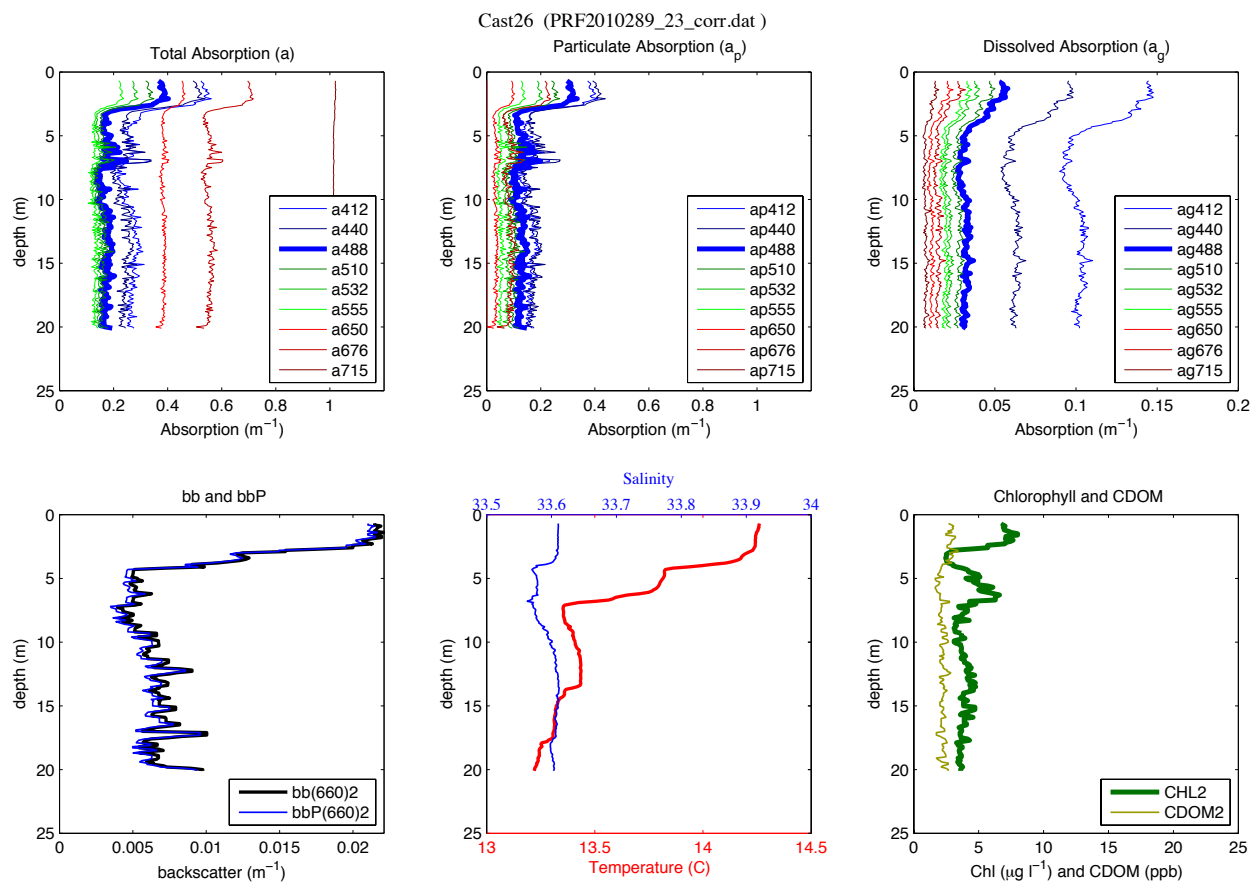


LISST

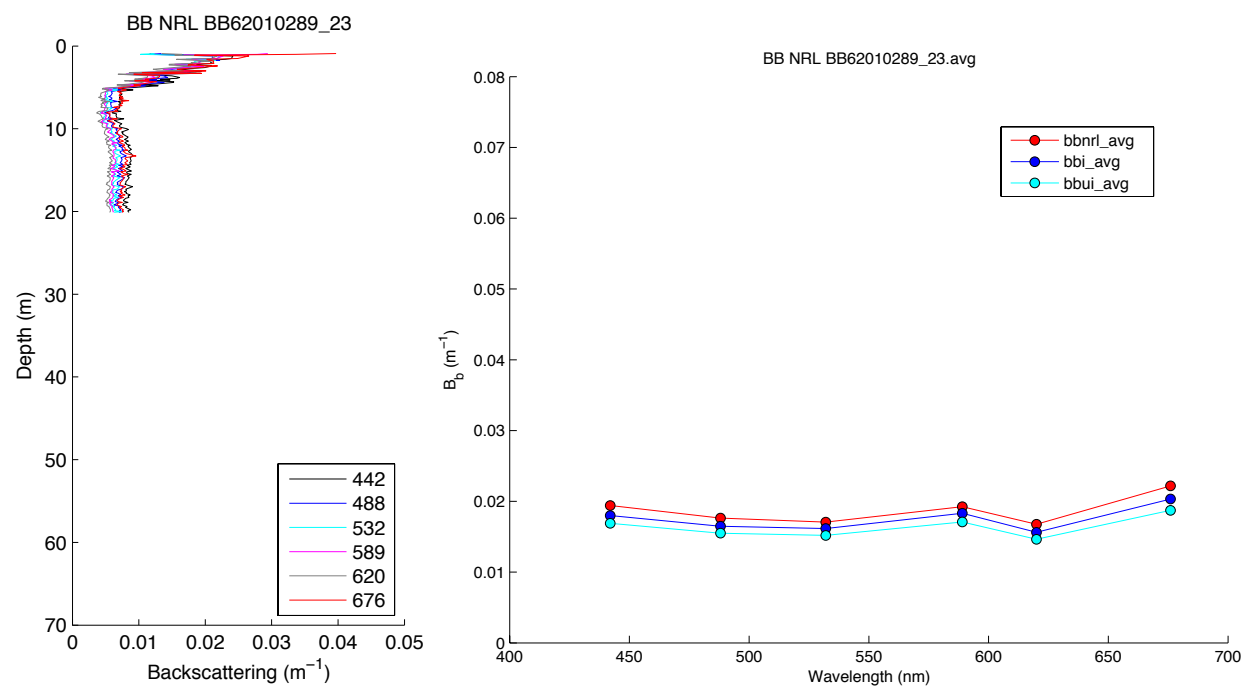
LISST – Cast 26



Optics Profile Package

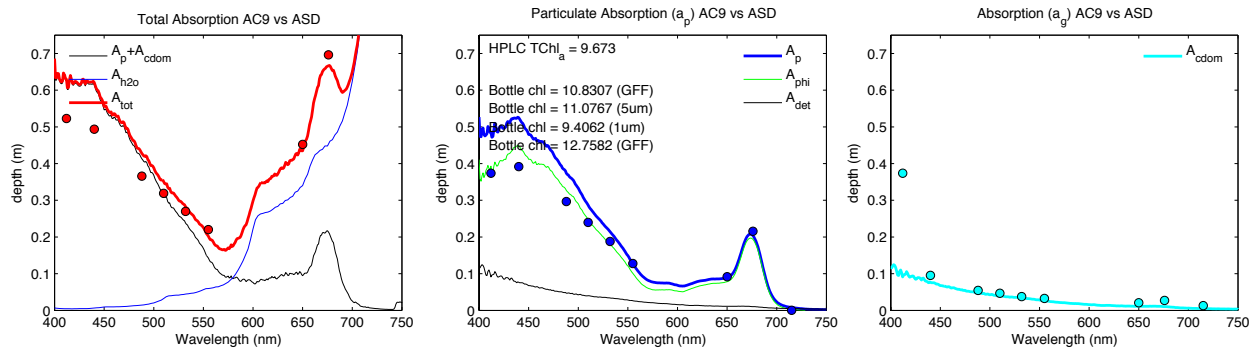


HydroScat

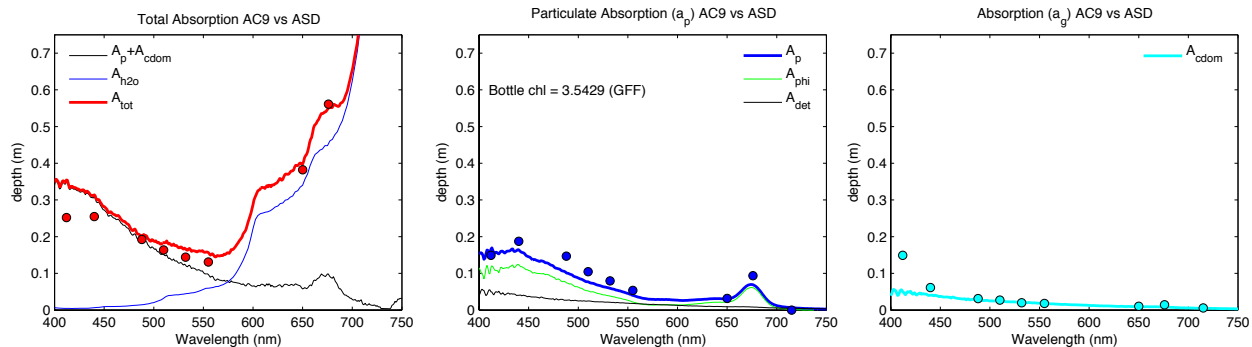


Filter Pad Absorption (w/ AC9)

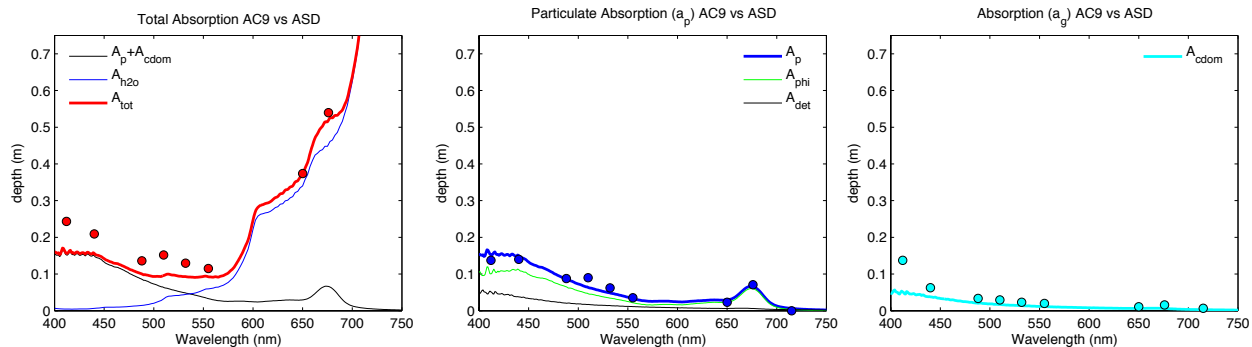
AC9 vs ASD Cast 26 – 0m (PRF2010289_23_corr.dat) CTD 31



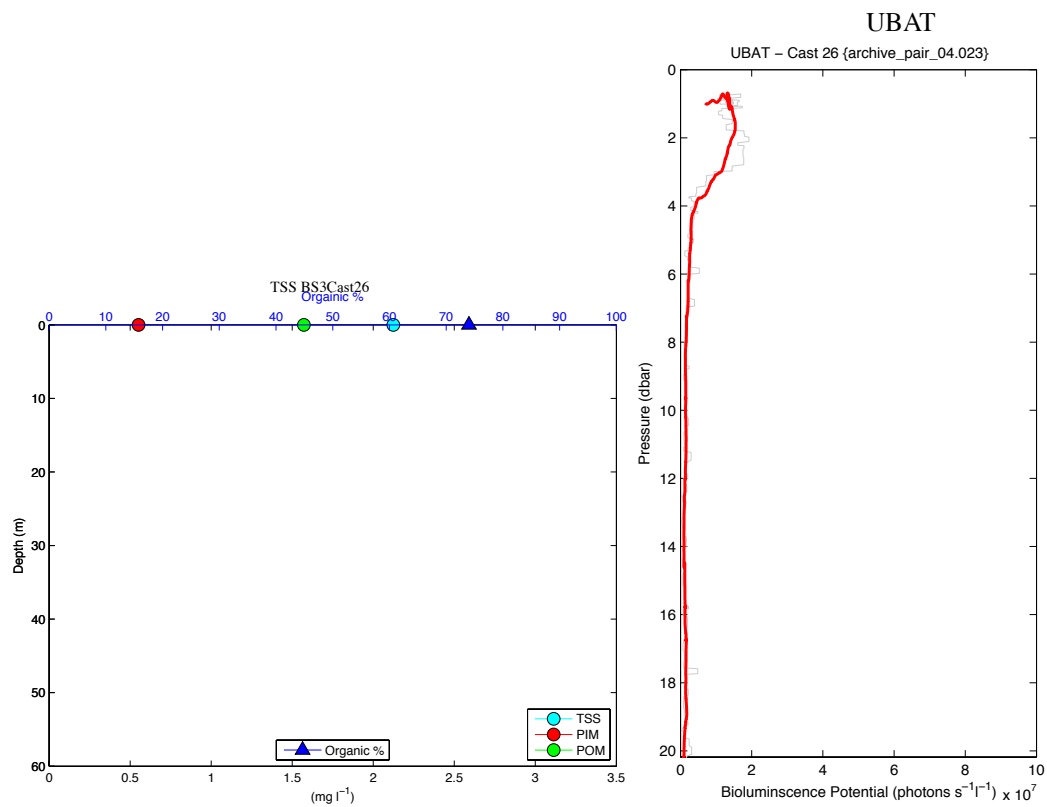
AC9 vs ASD Cast 26 – 5m (PRF2010289_23_corr.dat) CTD 31



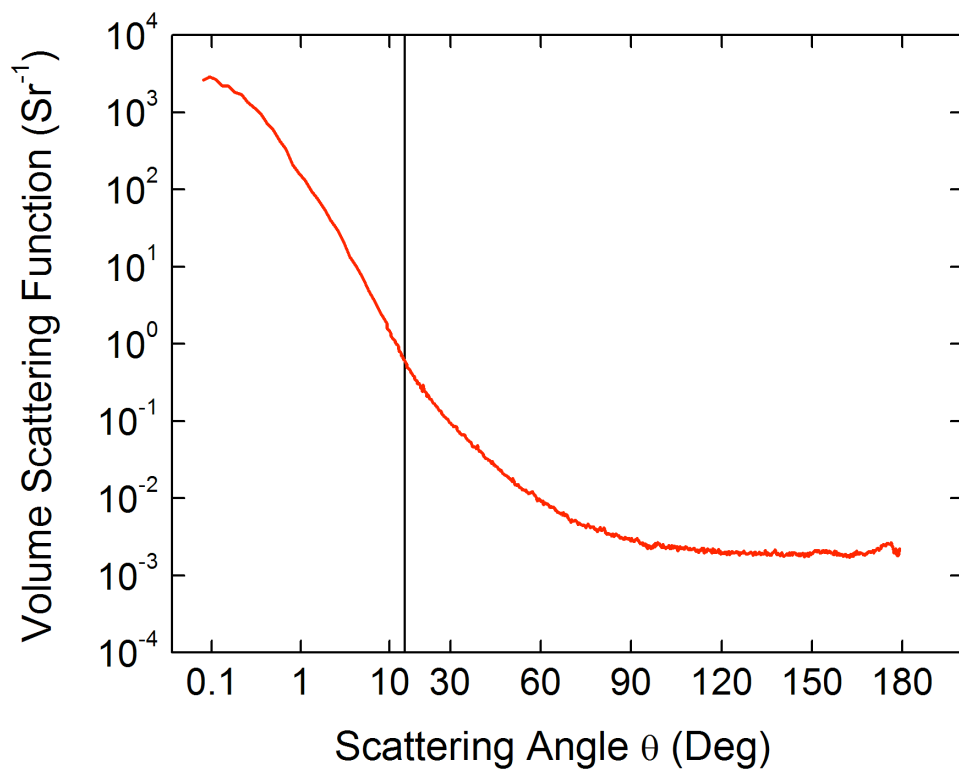
AC9 vs ASD Cast 26 – 10m (PRF2010289_23_corr.dat) CTD 31



TSS



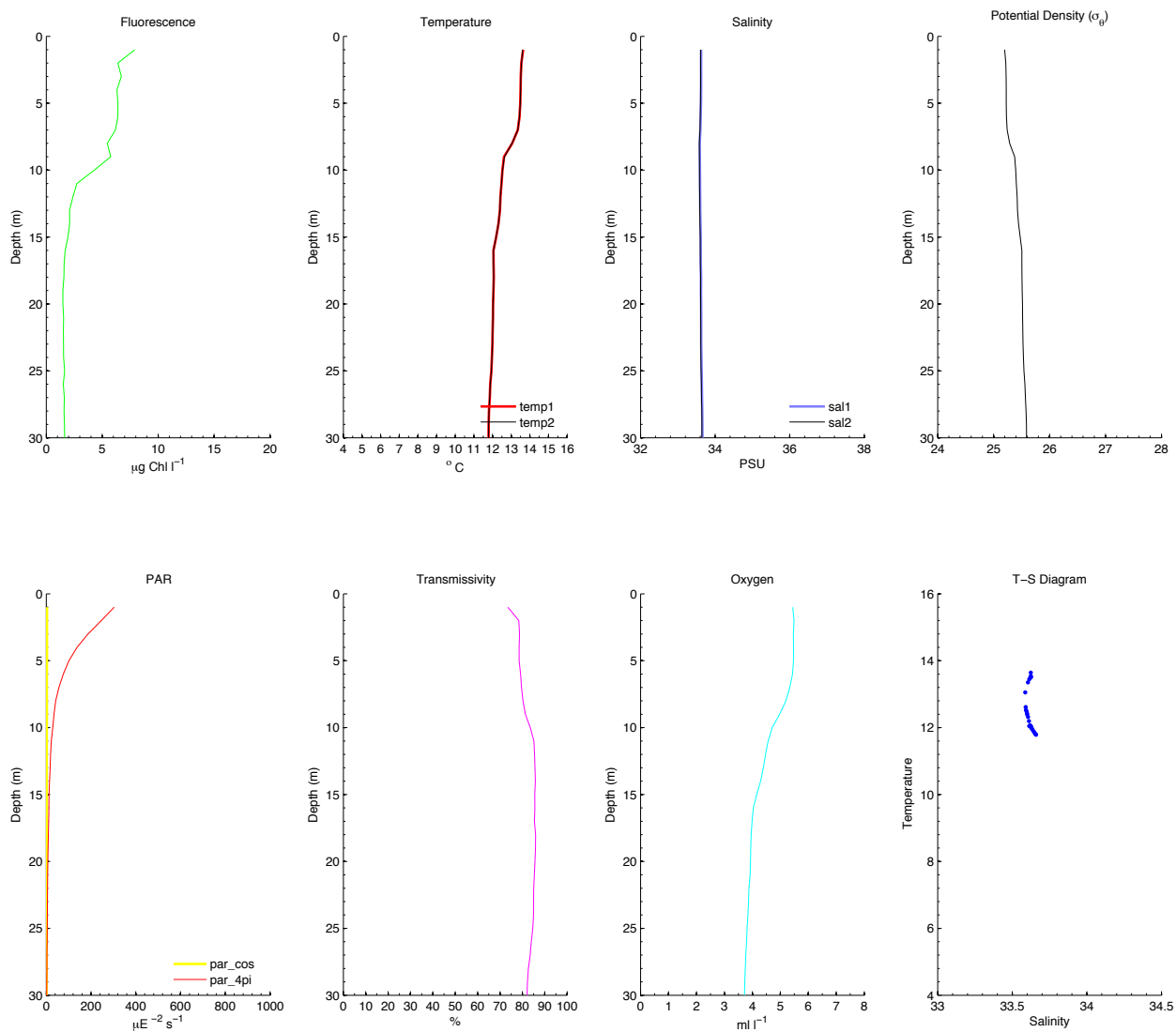
MVSC (532 nm)



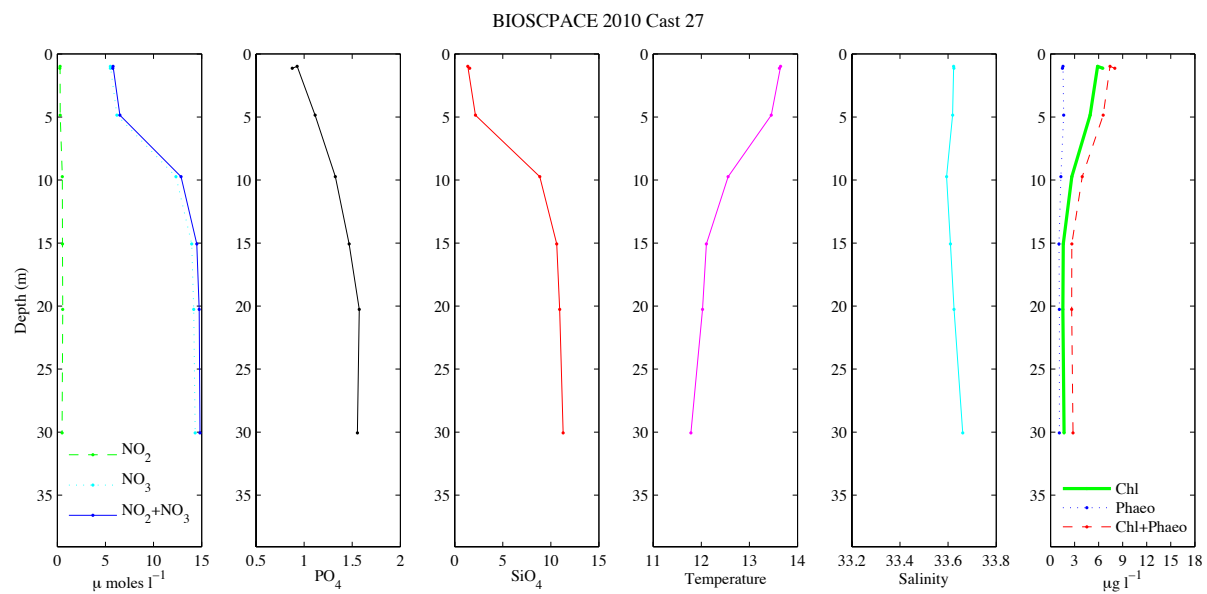
Cast 27 (1205 PDT; [Station BS32](#))
(foggy)

CTD

BIOSPACE 2010 Cast 27 (CTD32; 2010-10-16 19:03:00.000 UTC) CTD Downcast Data (Calibrated)

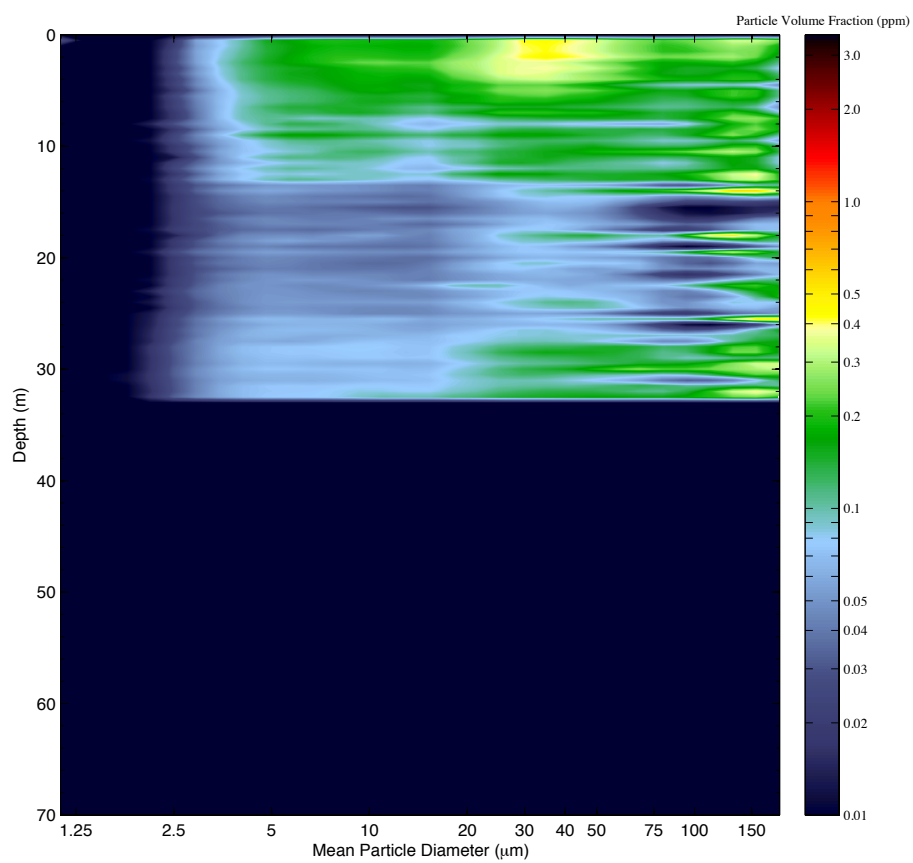


Bottle Nutrients and Chlorophyll

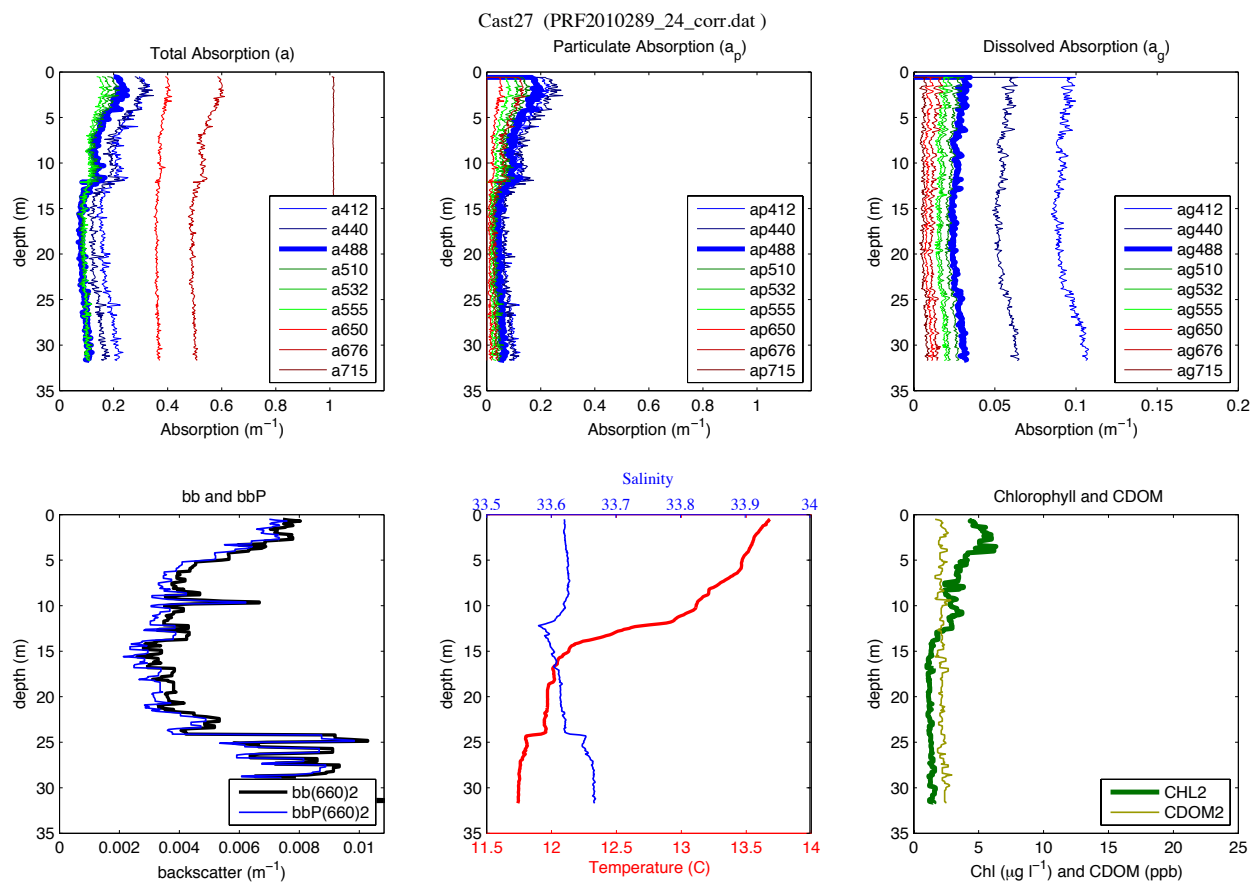


LISST

LISST – Cast 27

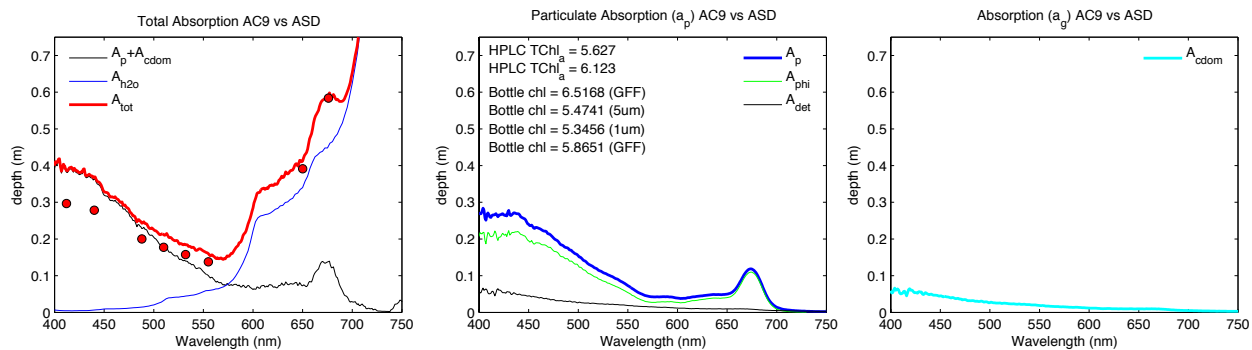


Optics Profile Package

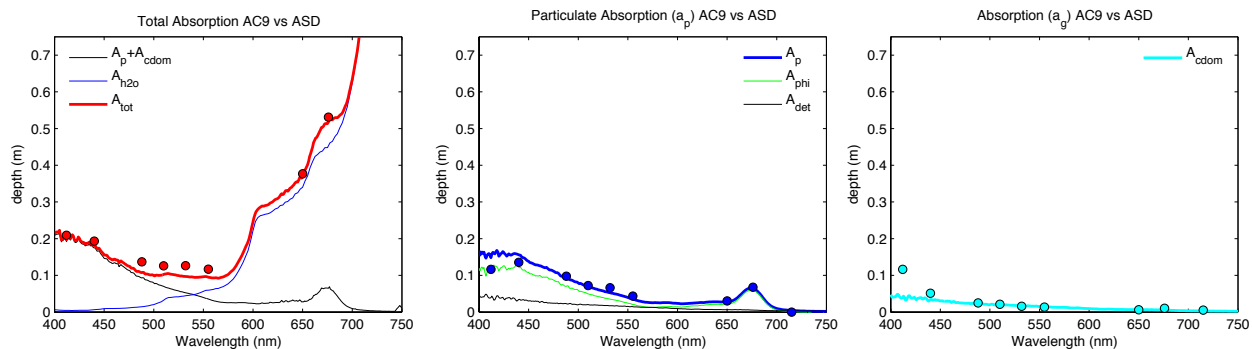


Filter Pad Absorption (w/ AC9)

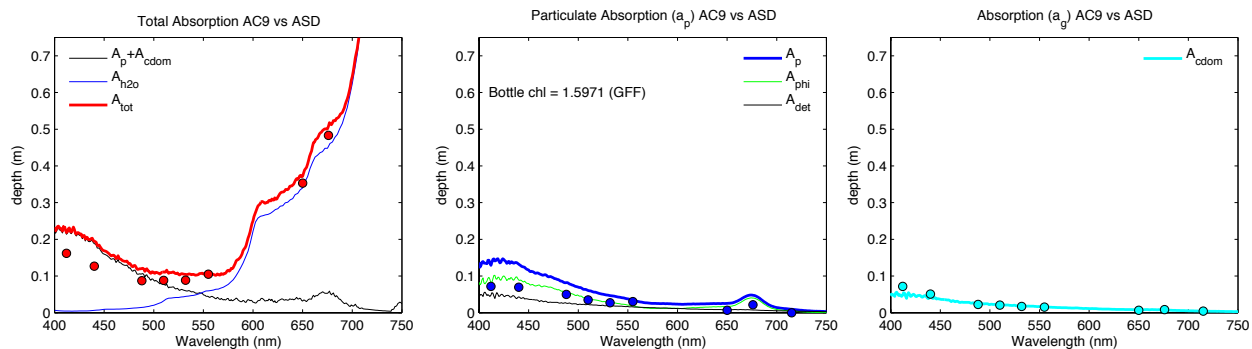
AC9 vs ASD Cast 27 – 0m (PRF2010289_24_corr.dat) CTD 04



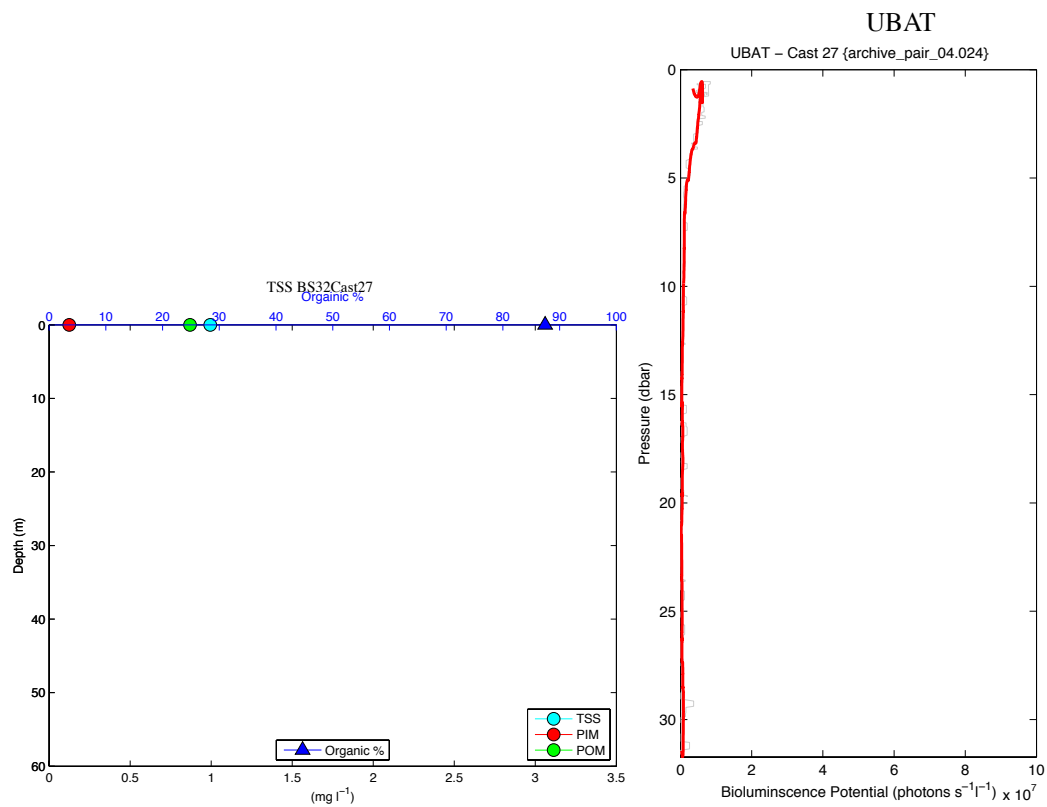
AC9 vs ASD Cast 27 – 8m (PRF2010289_24_corr.dat) CTD 04



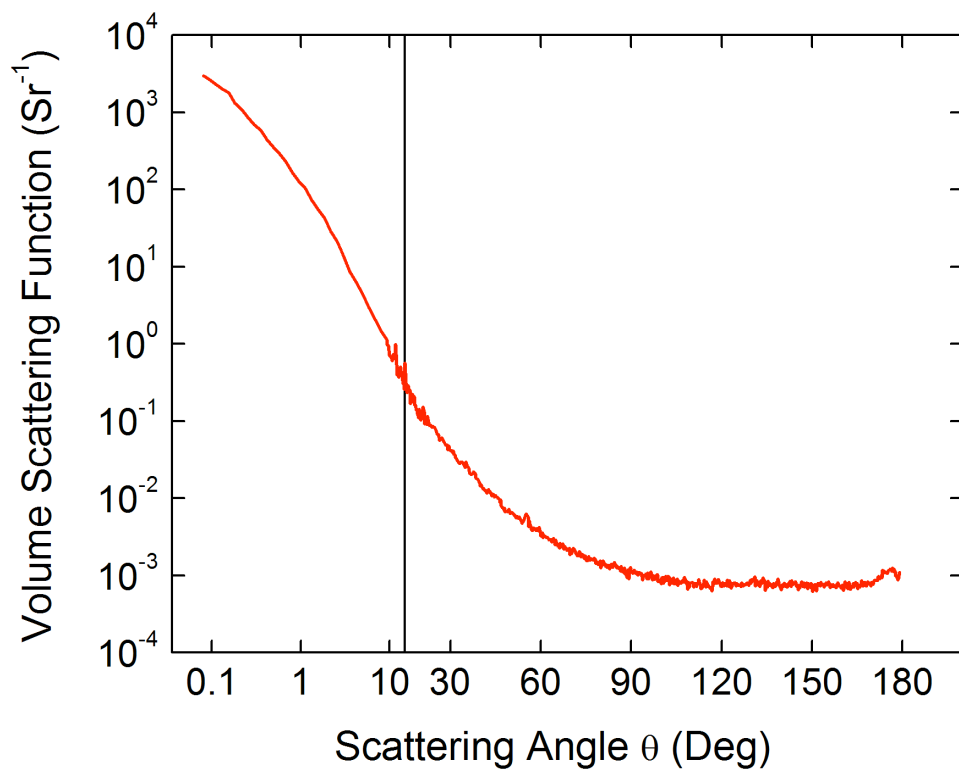
AC9 vs ASD Cast 27 – 15m (PRF2010289_24_corr.dat) CTD 04



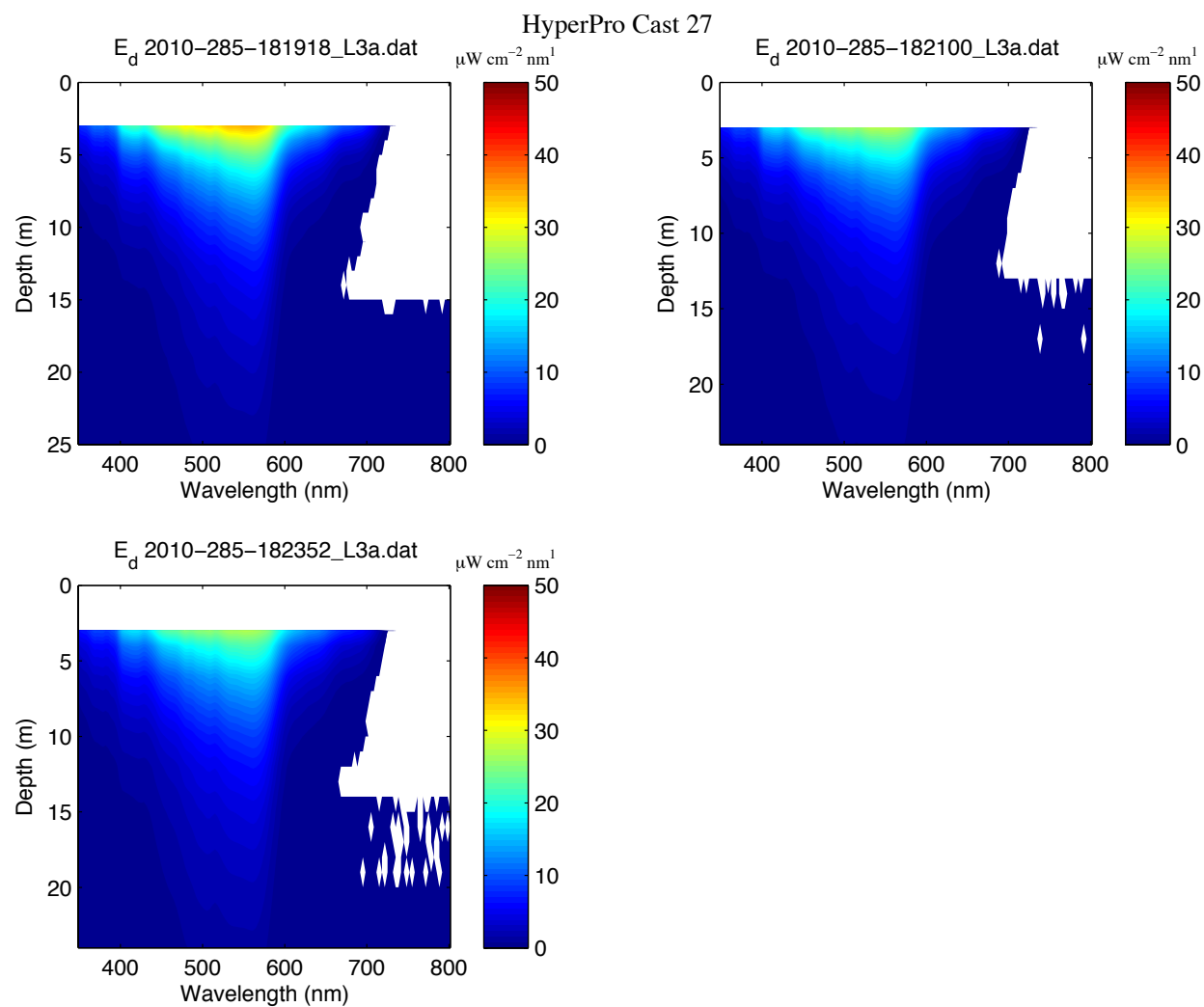
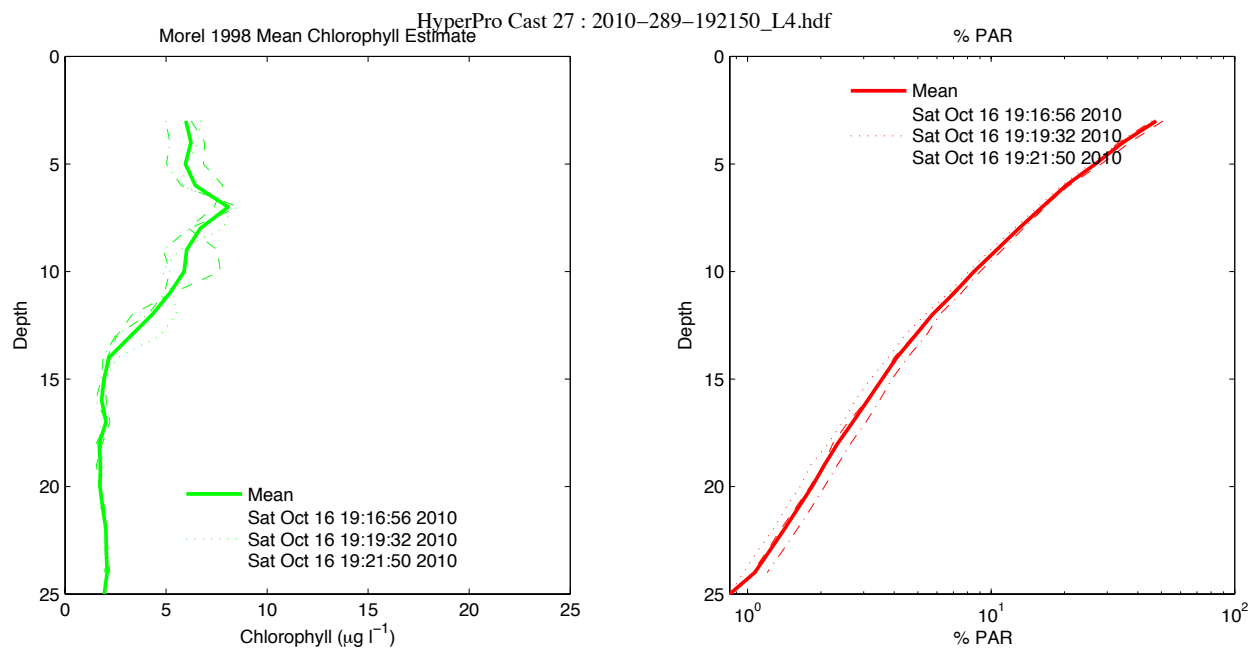
TSS



MVSC (532 nm)



HyperPro

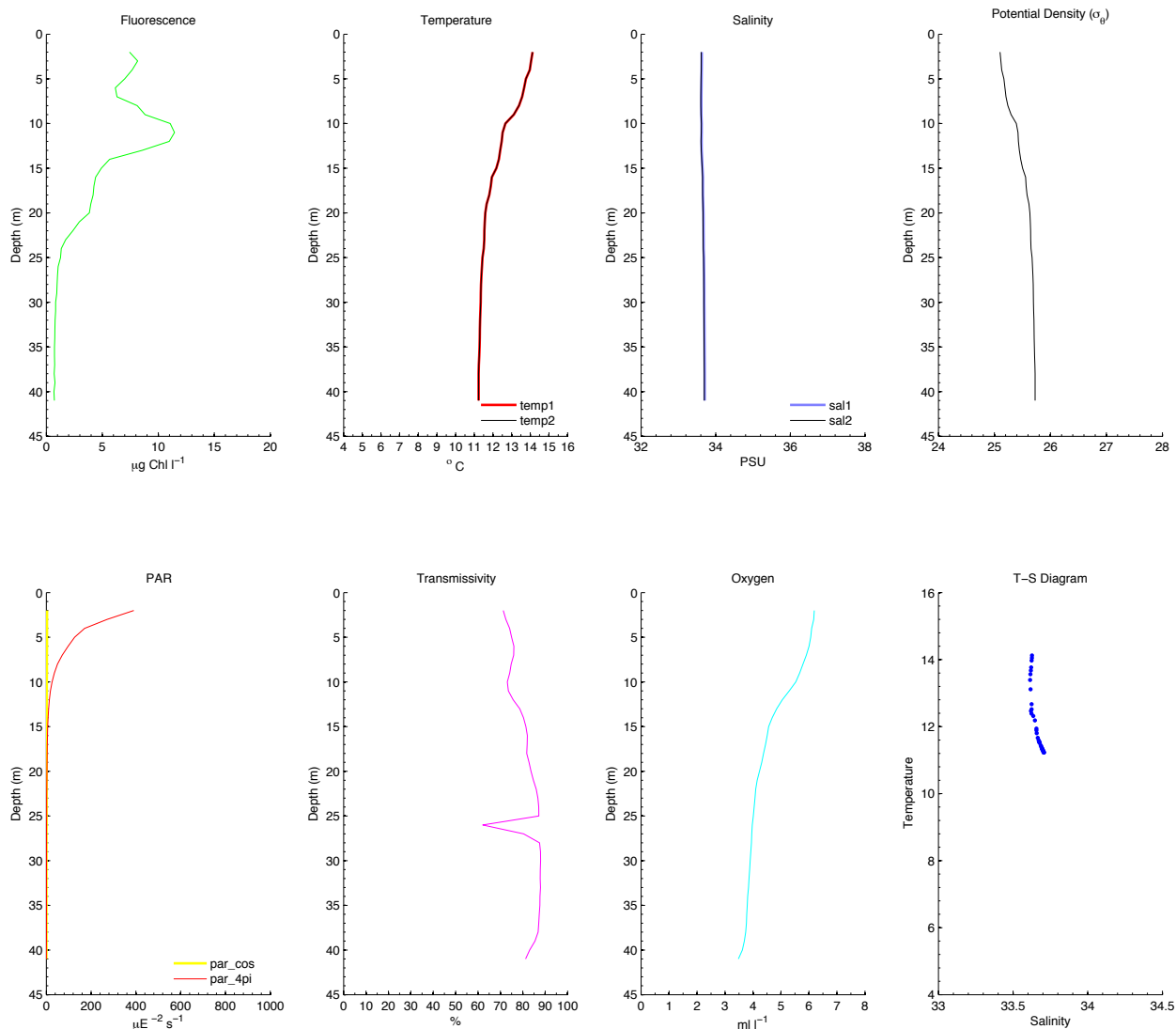


Cast 28 (1317 PDT; [Station BS30](#))

(plankton net: mixed dinos (*Prorocentrum* and *Ceratium* predominated) no diatoms. A large bloom passed under boat during the station - CTD cast, water samples and hyperpro missed it; the optics package and plankton net did sample it (note: check UDAS fluorometer for this signal). Deric said MVSM showed a strange signal when this patch passed.) (a front moved across the ship around 1335; hyperpro cast was before front, optics and spectrex after) (overcast, but clearing)

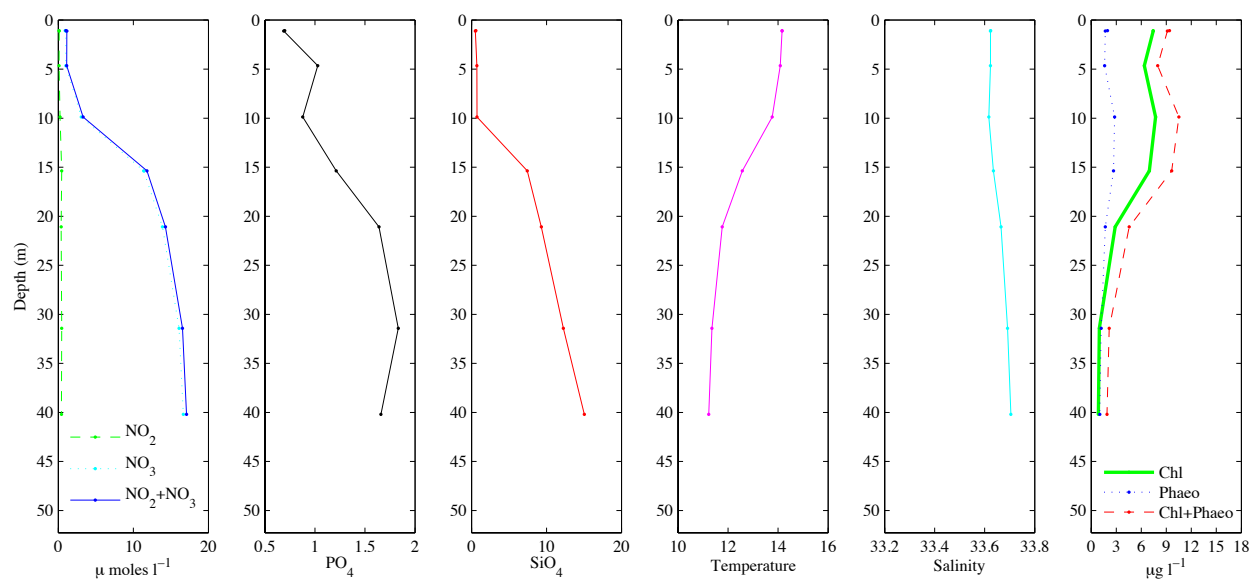
CTD

BIOSPACE 2010 Cast 28 (CTD30; 2010-10-16 20:21:00.000 UTC) CTD Downcast Data (Calibrated)



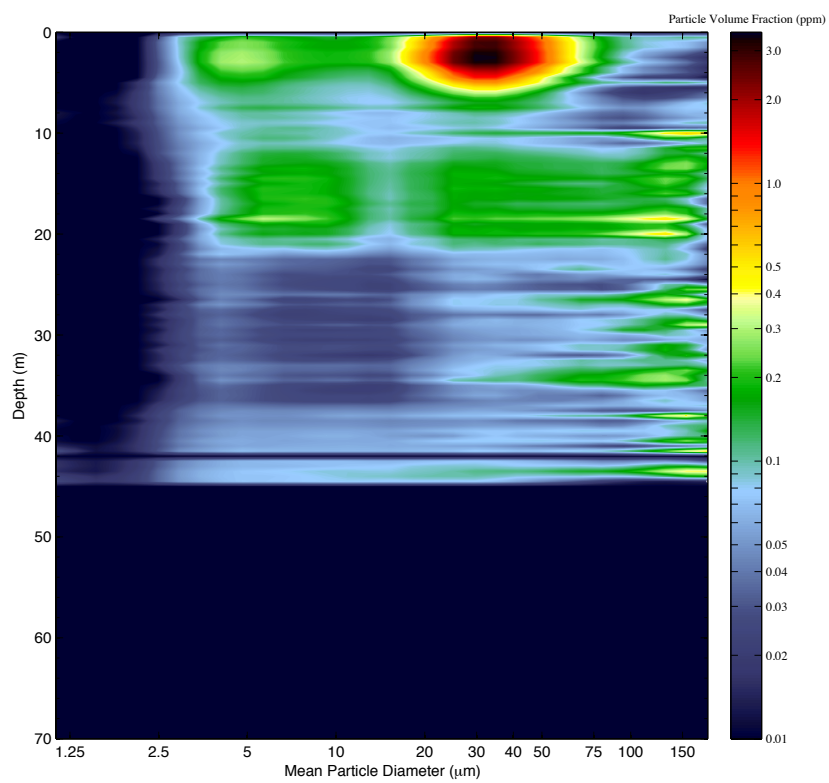
Bottle Nutrients and Chlorophyll

BIOSPACE 2010 Cast 28

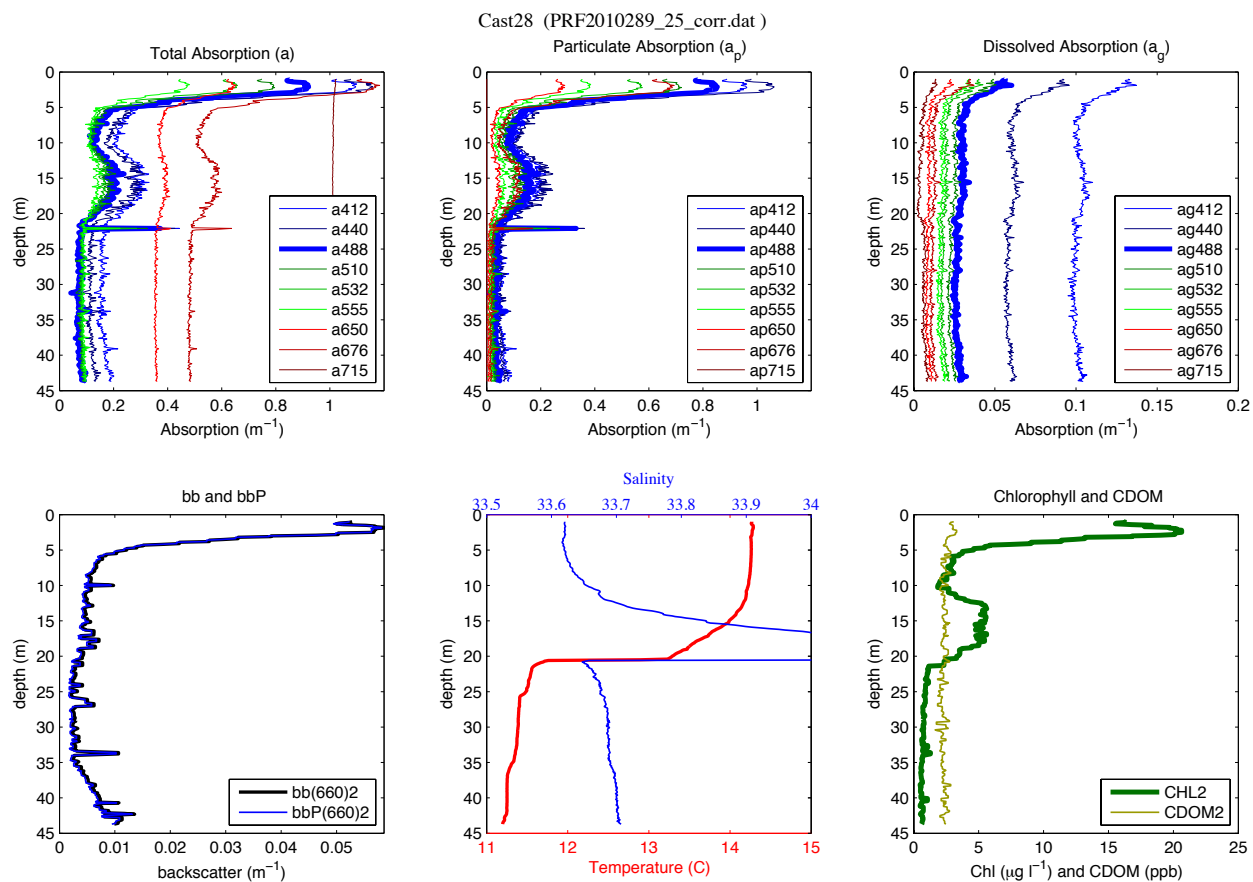


LISST

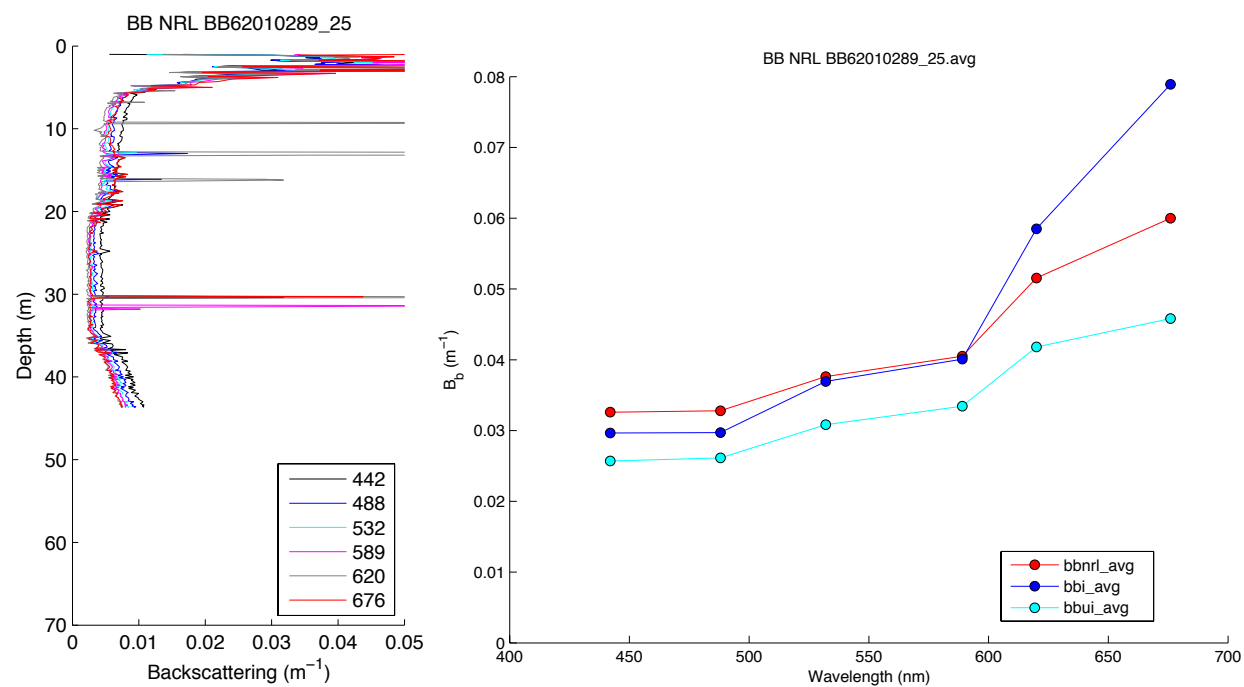
LISST – Cast 28



Optics Profile Package

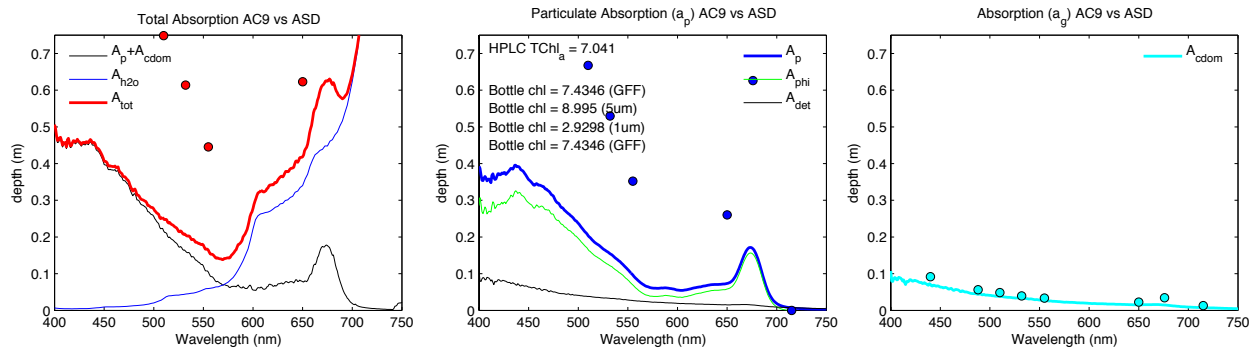


HydroScat

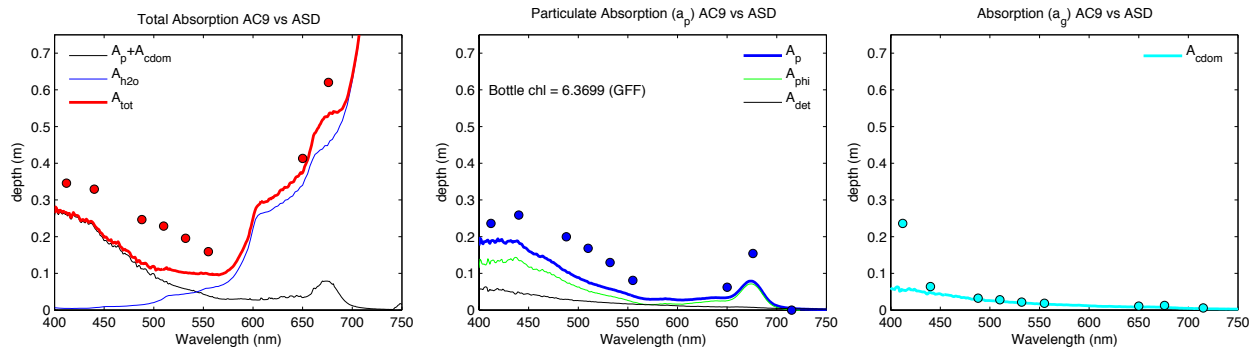


Filter Pad Absorption (w/ AC9)

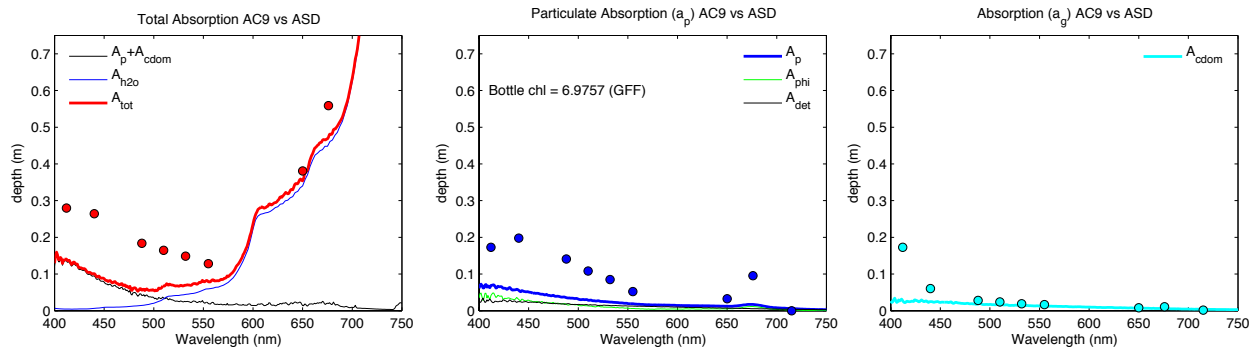
AC9 vs ASD Cast 28 – 0m (PRF2010289_25_corr.dat) CTD 03



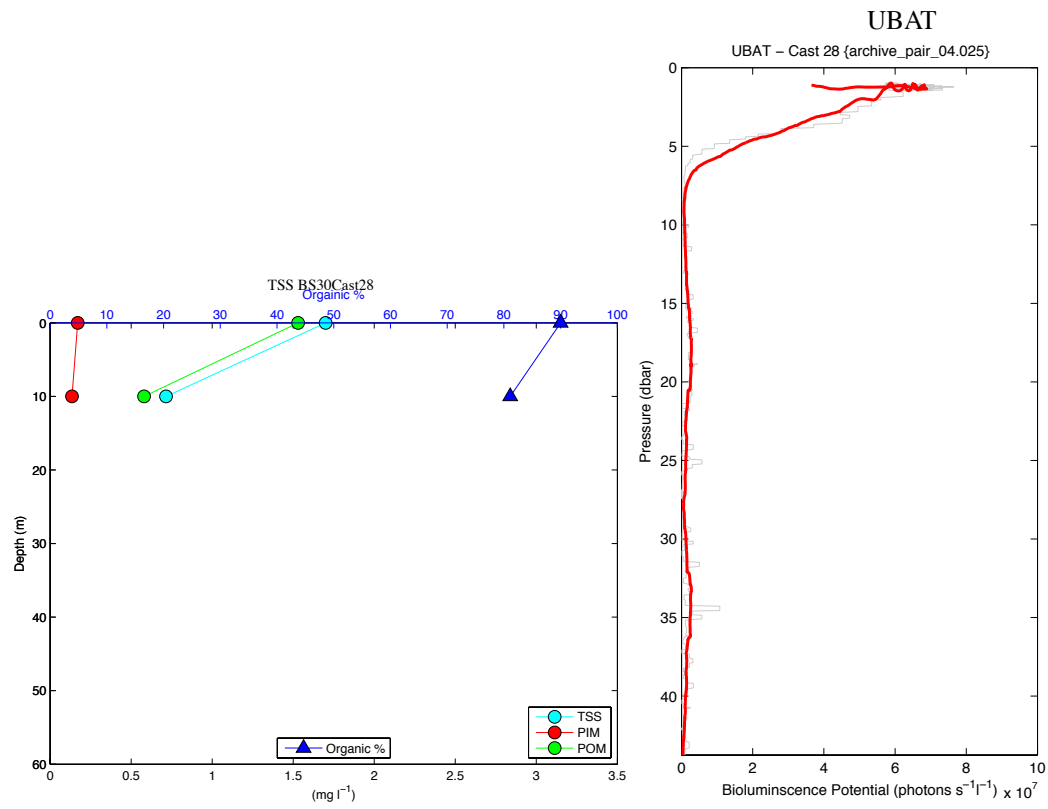
AC9 vs ASD Cast 28 – 5m (PRF2010289_25_corr.dat) CTD 03



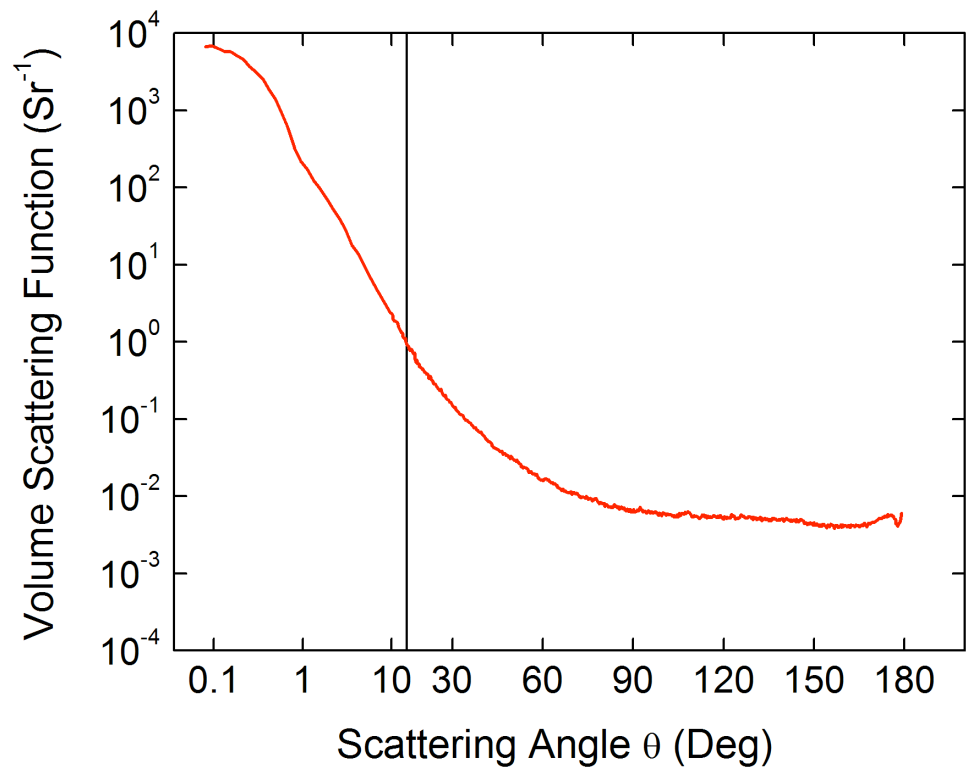
AC9 vs ASD Cast 28 – 15m (PRF2010289_25_corr.dat) CTD 03



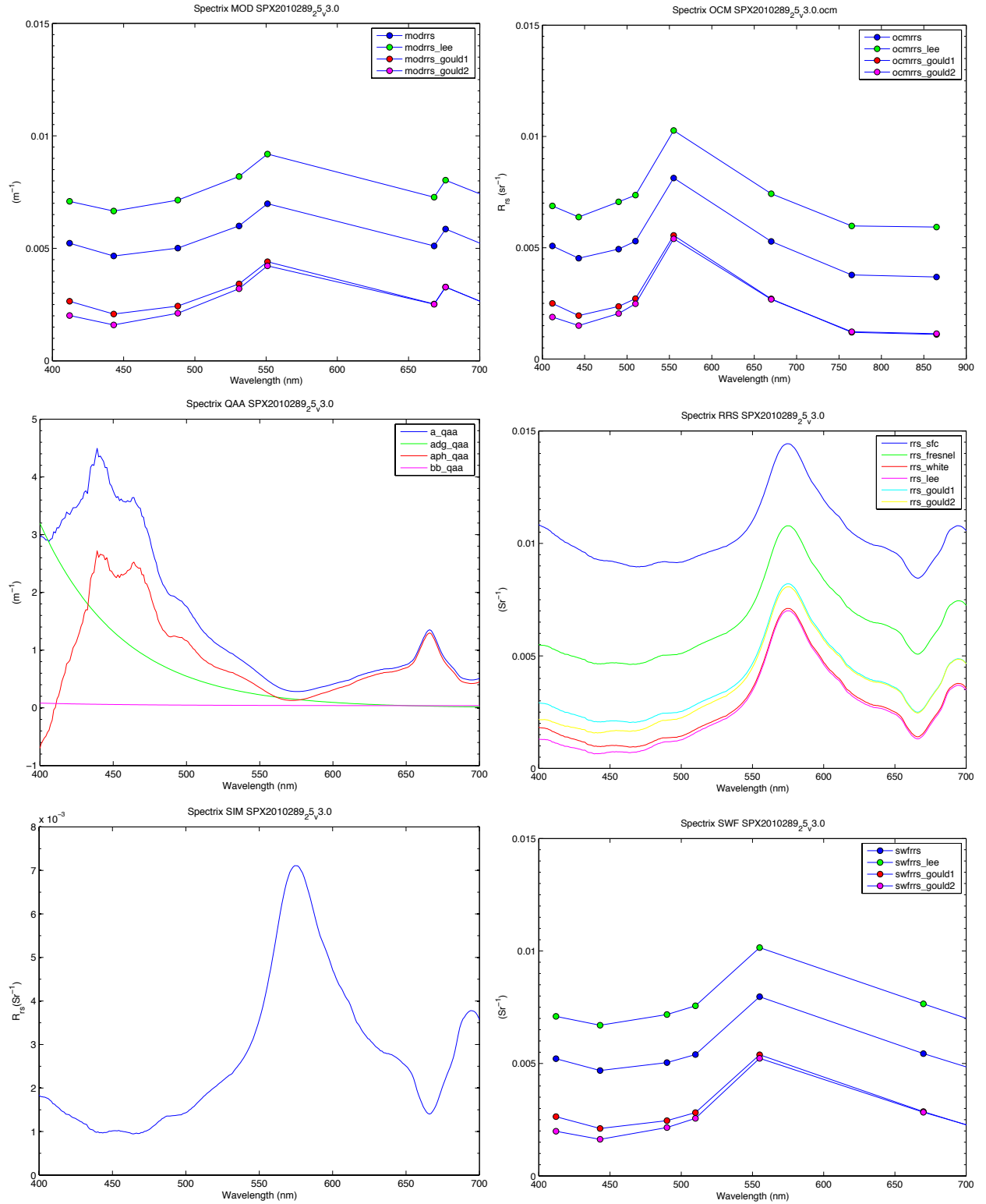
TSS



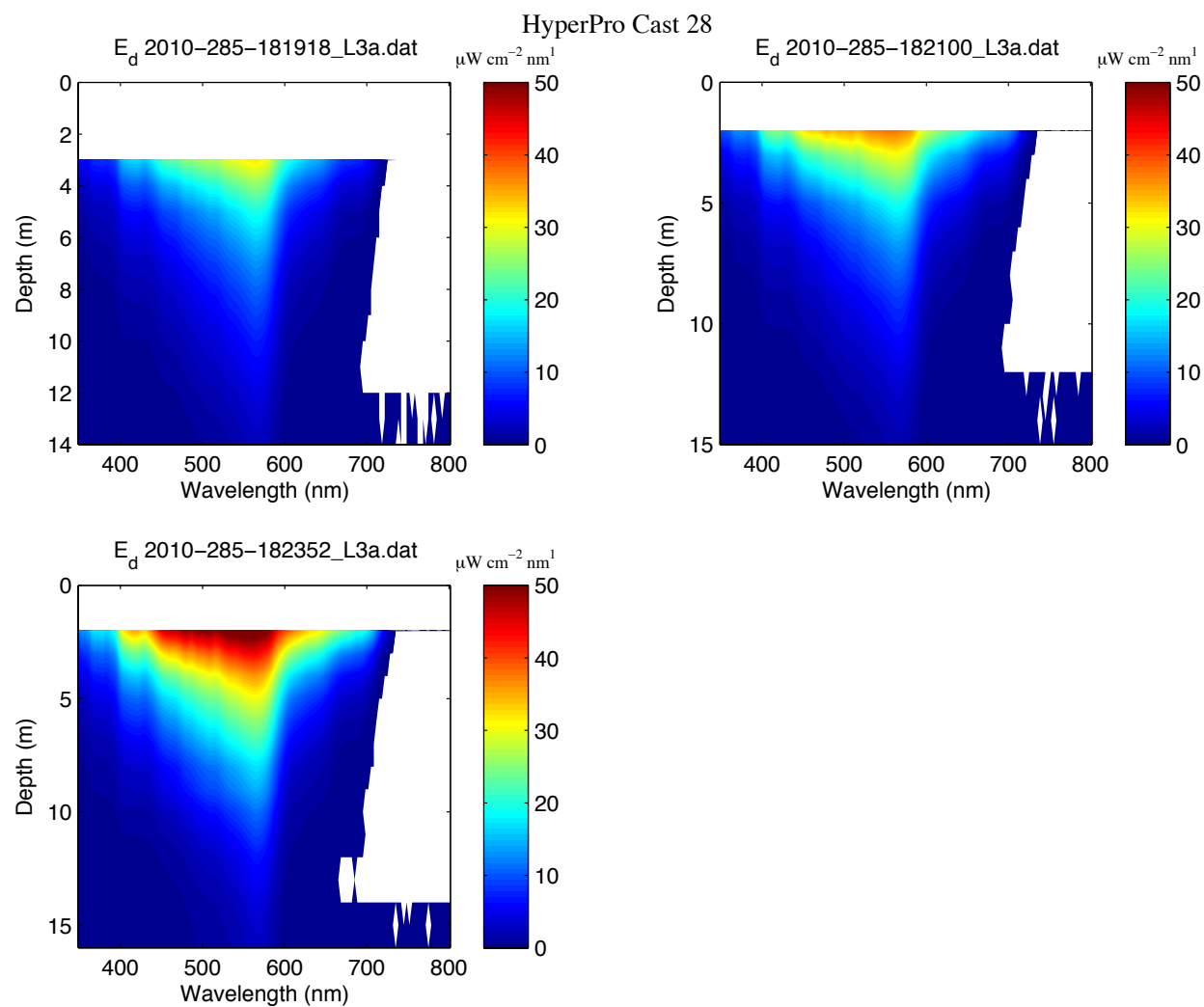
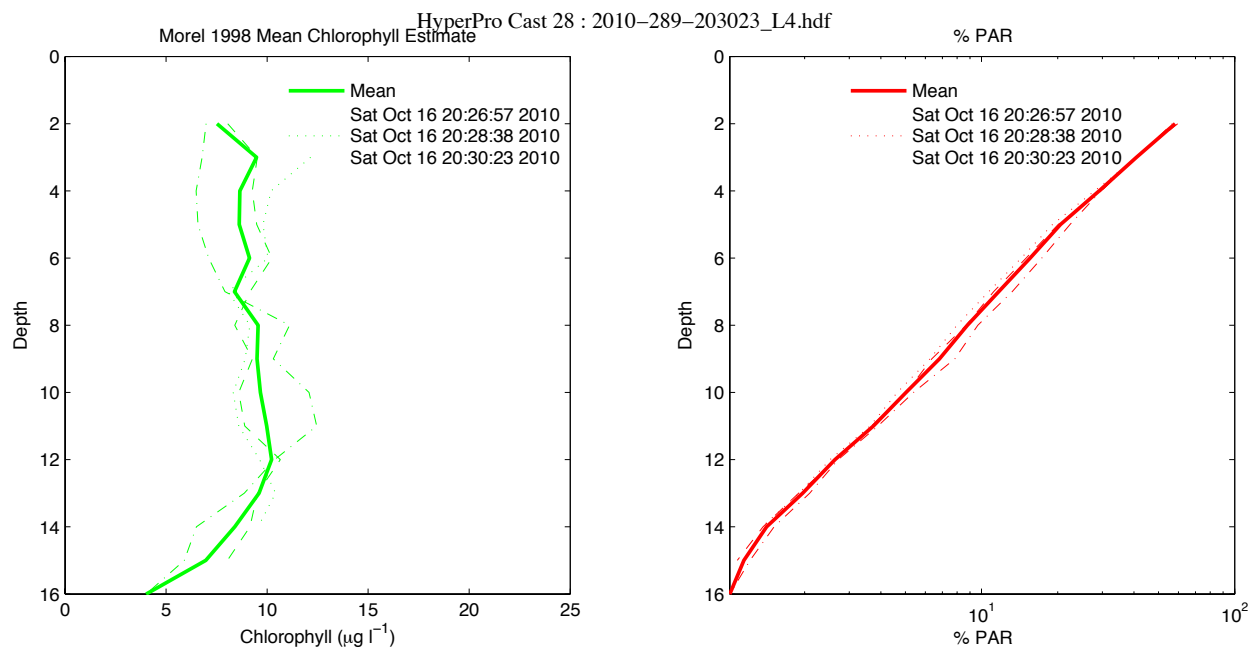
MVSM



SPECTRIX



HyperPro

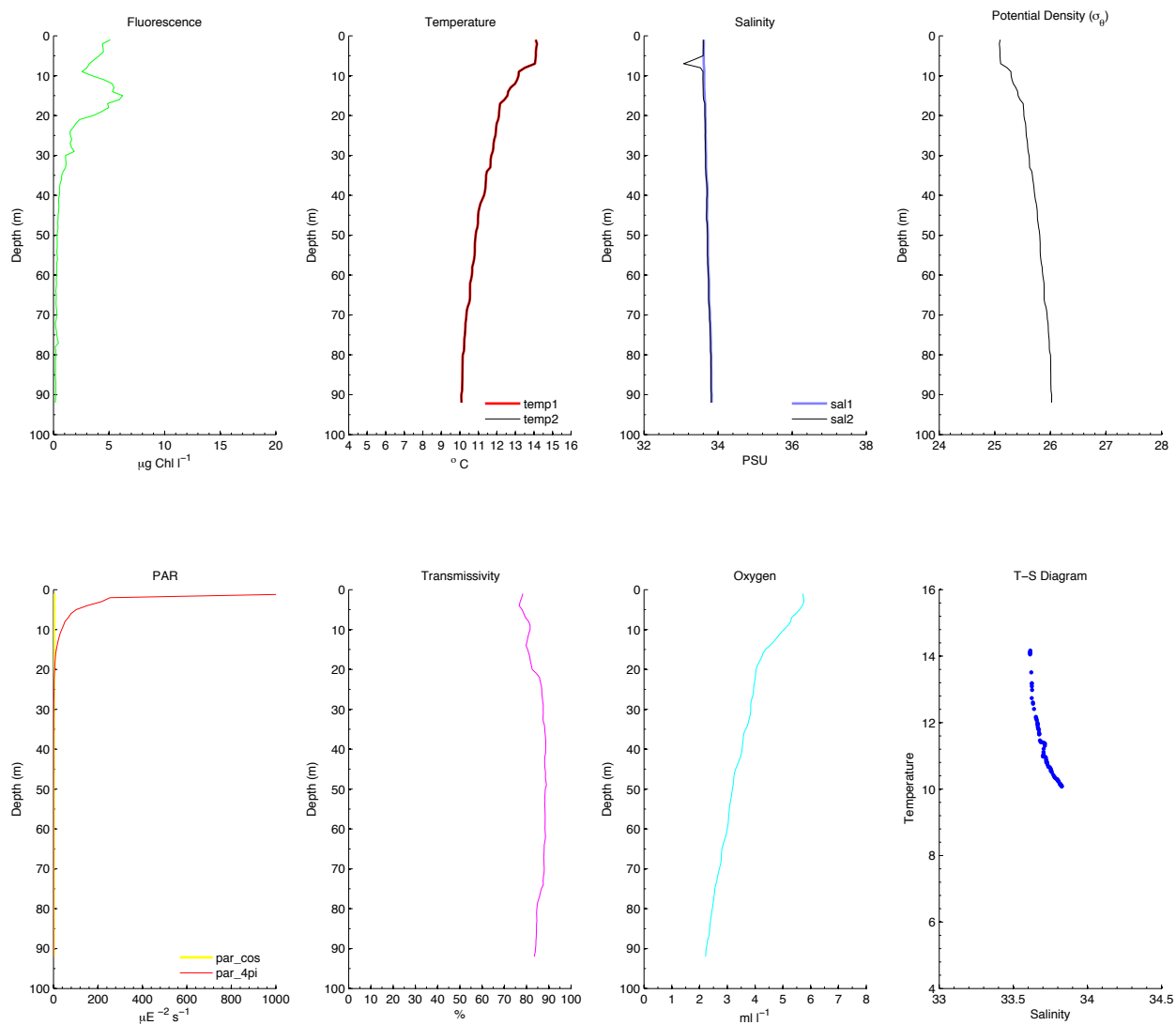


Cast 29 (1436 PDT; [Station BS06](#))

(mostly overcast, some patches of blue)

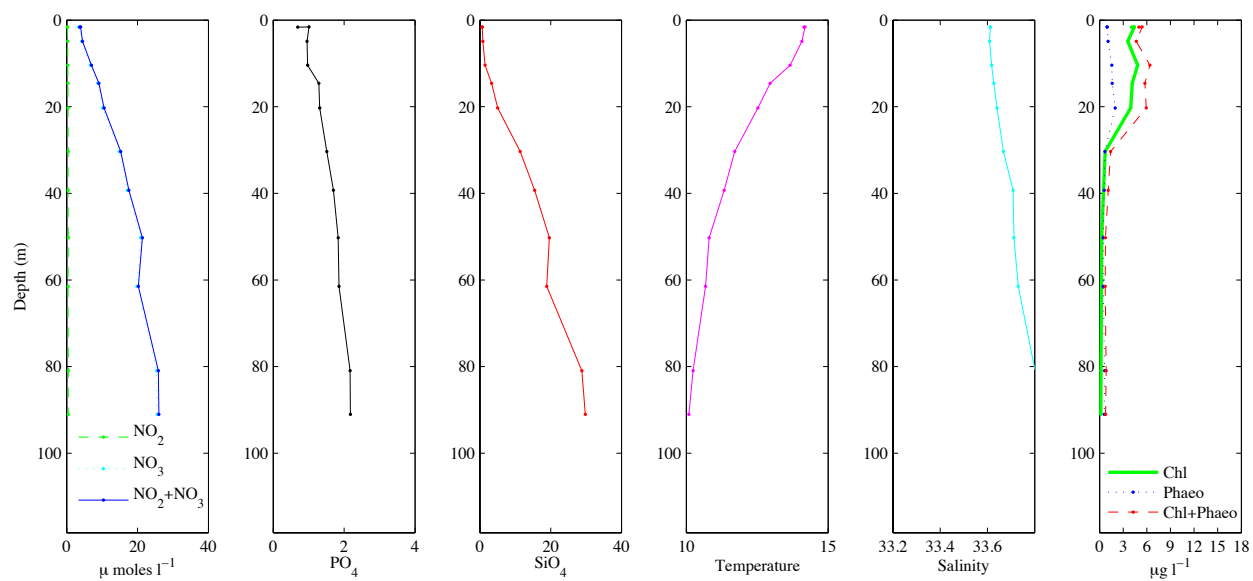
CTD

BIOSPACE 2010 Cast 29 (CTD06; 2010-10-16 21:38:00.000 UTC) CTD Downcast Data (Calibrated)



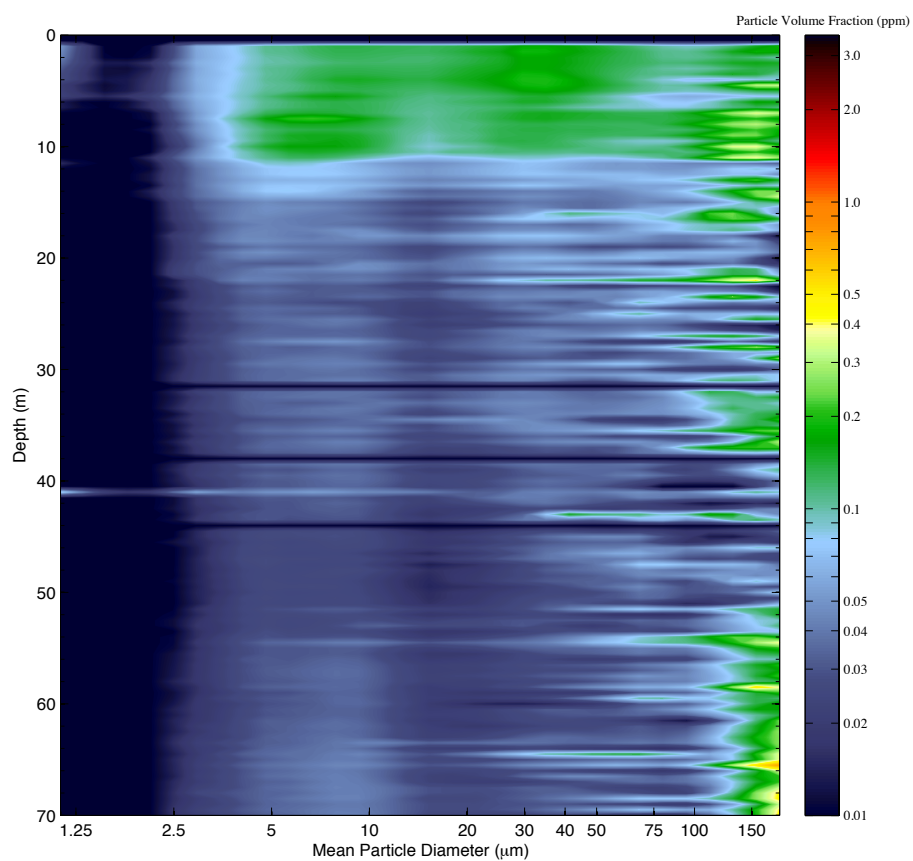
Bottle Nutrients and Chlorophyll

BIOSPACE 2010 Cast 29

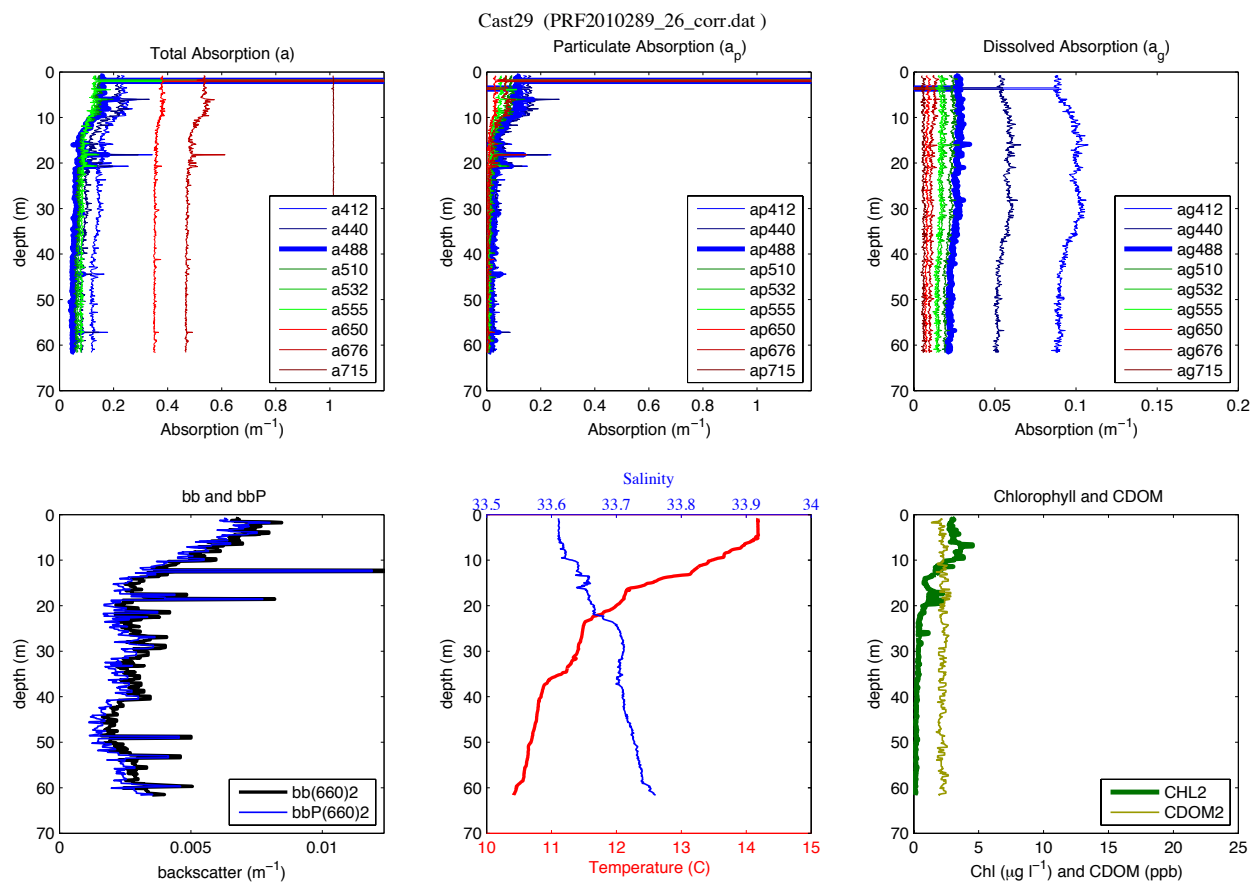


LISST

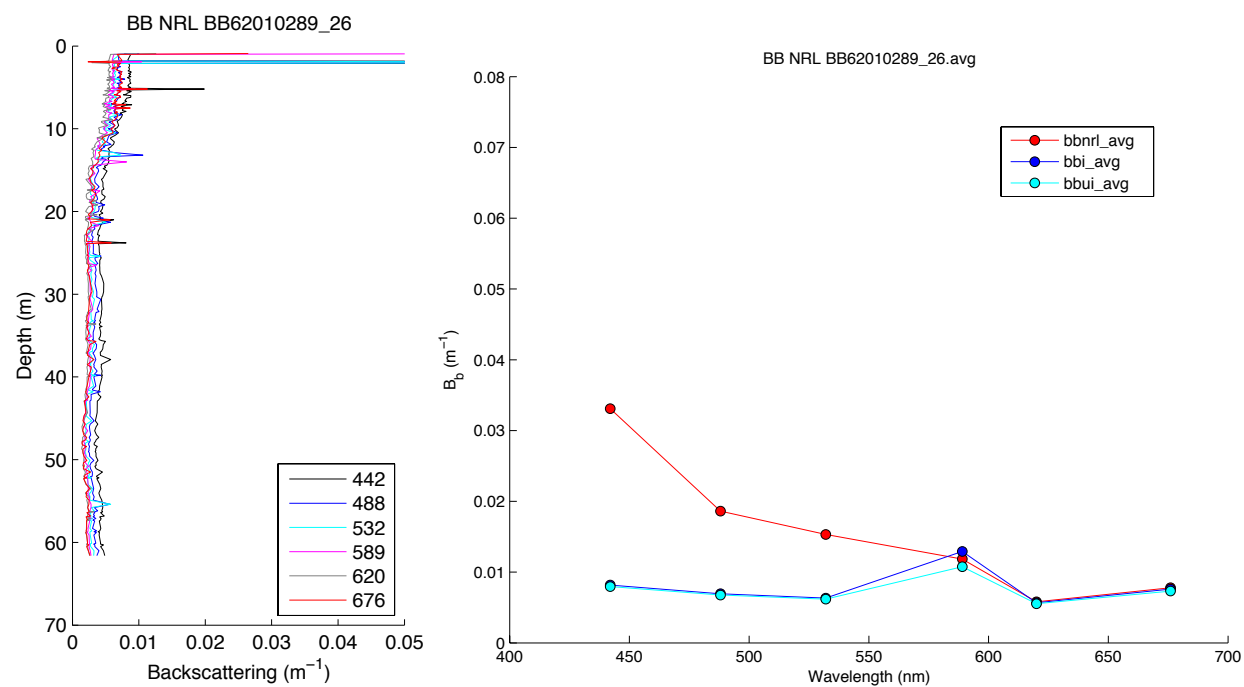
LISST – Cast 29



Optics Profile Package

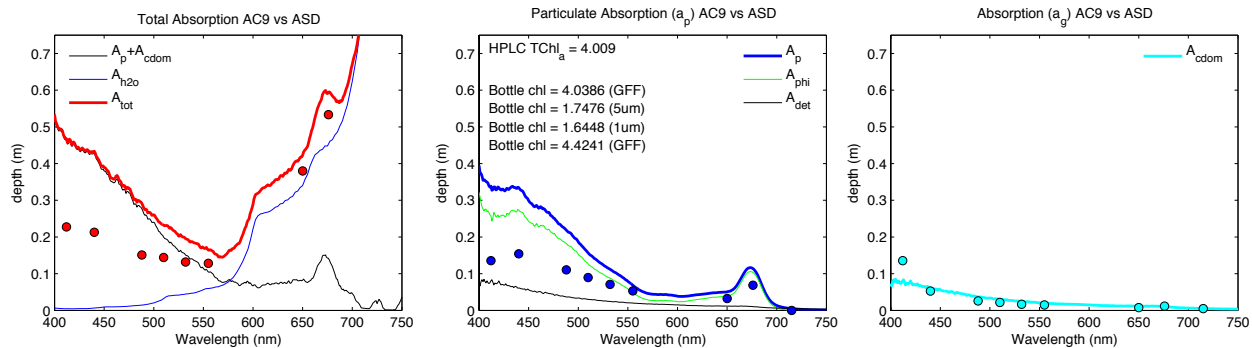


HydroScat

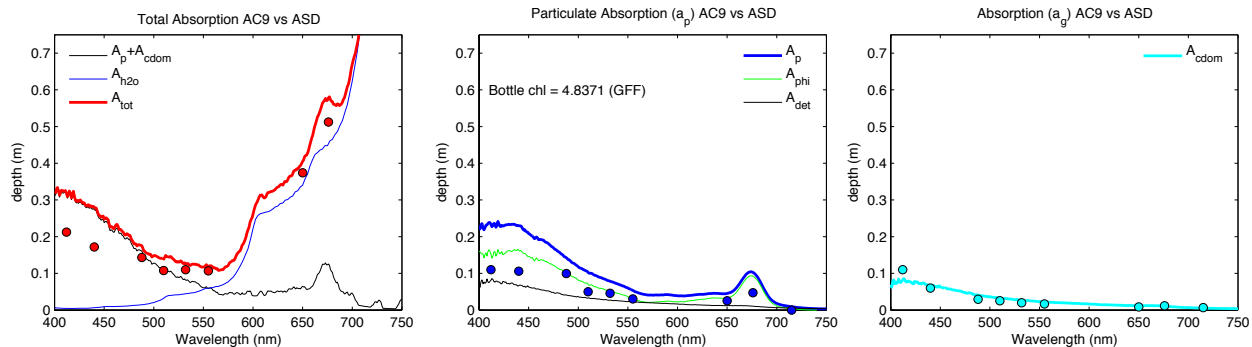


Filter Pad Absorption (w/ AC9)

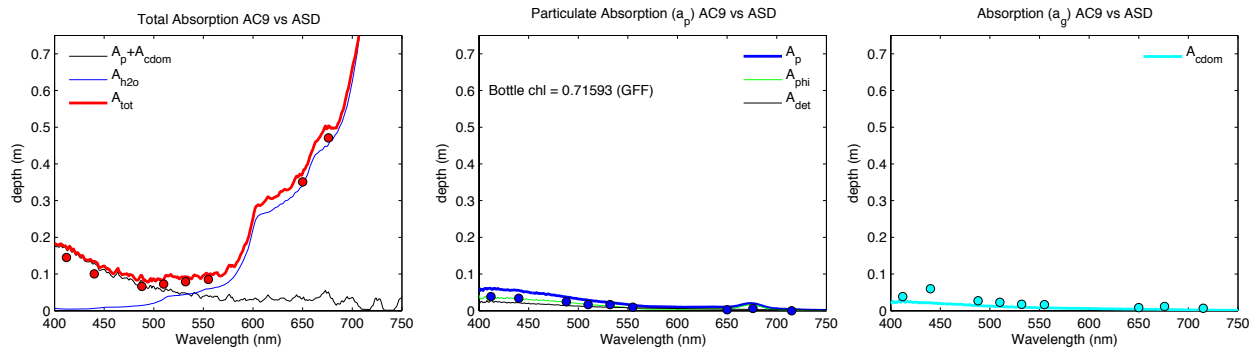
AC9 vs ASD Cast 29 – 0m (PRF2010289_26_corr.dat) CTD 32



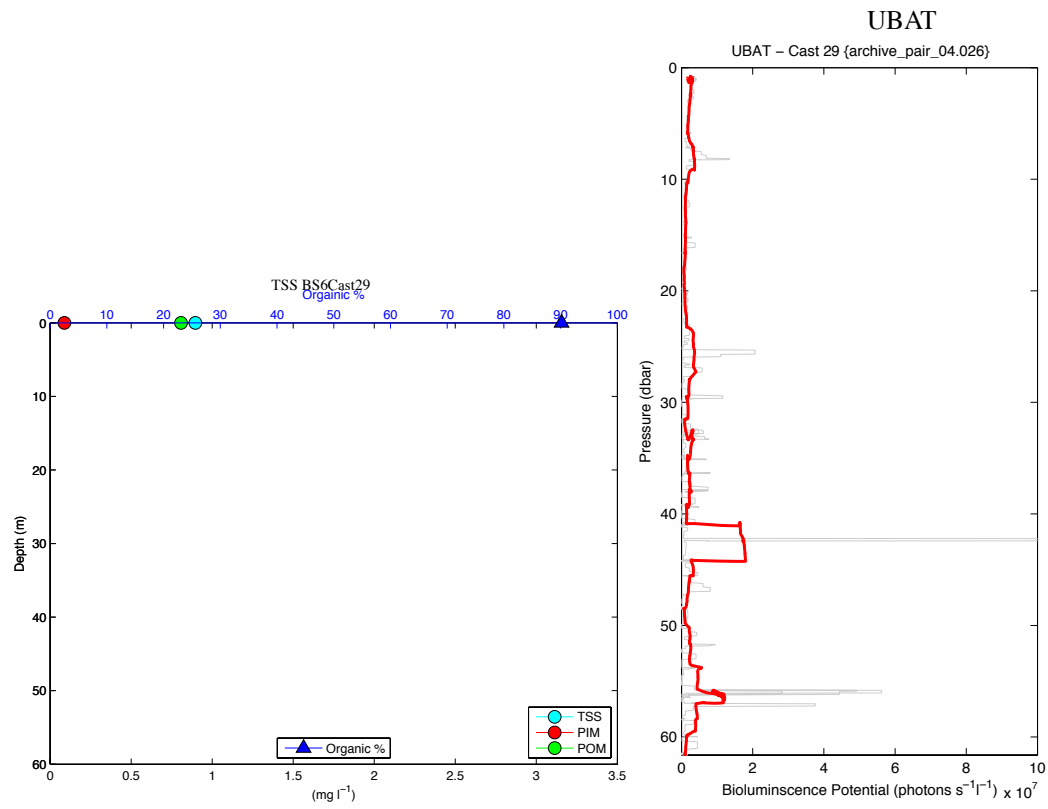
AC9 vs ASD Cast 29 – 10m (PRF2010289_26_corr.dat) CTD 32



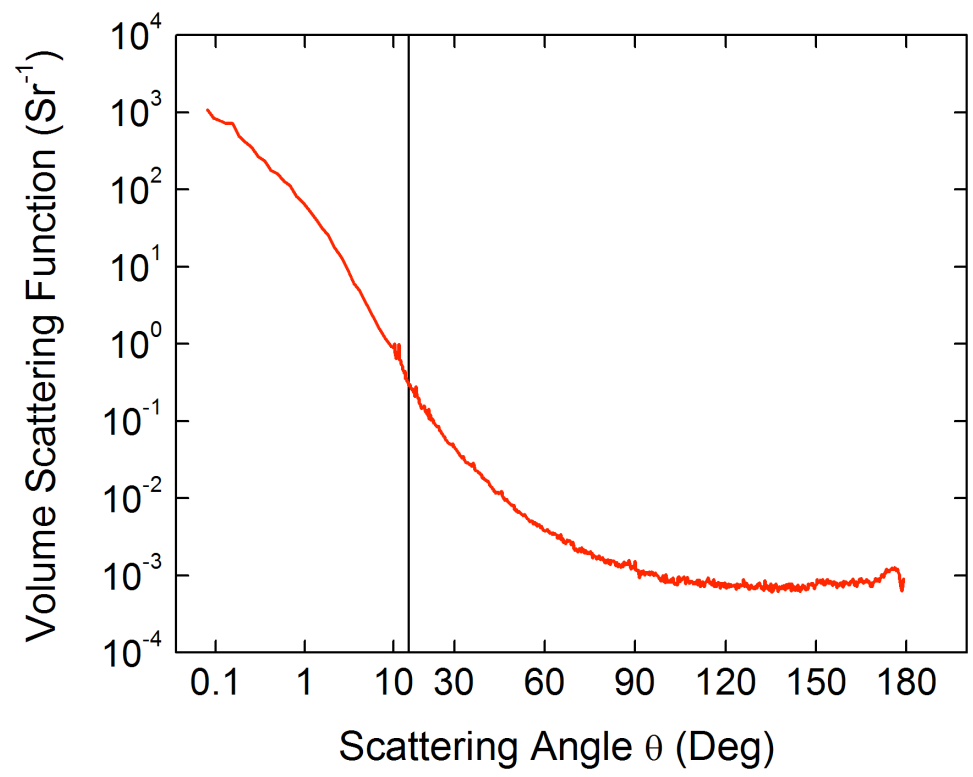
AC9 vs ASD Cast 29 – 30m (PRF2010289_26_corr.dat) CTD 32



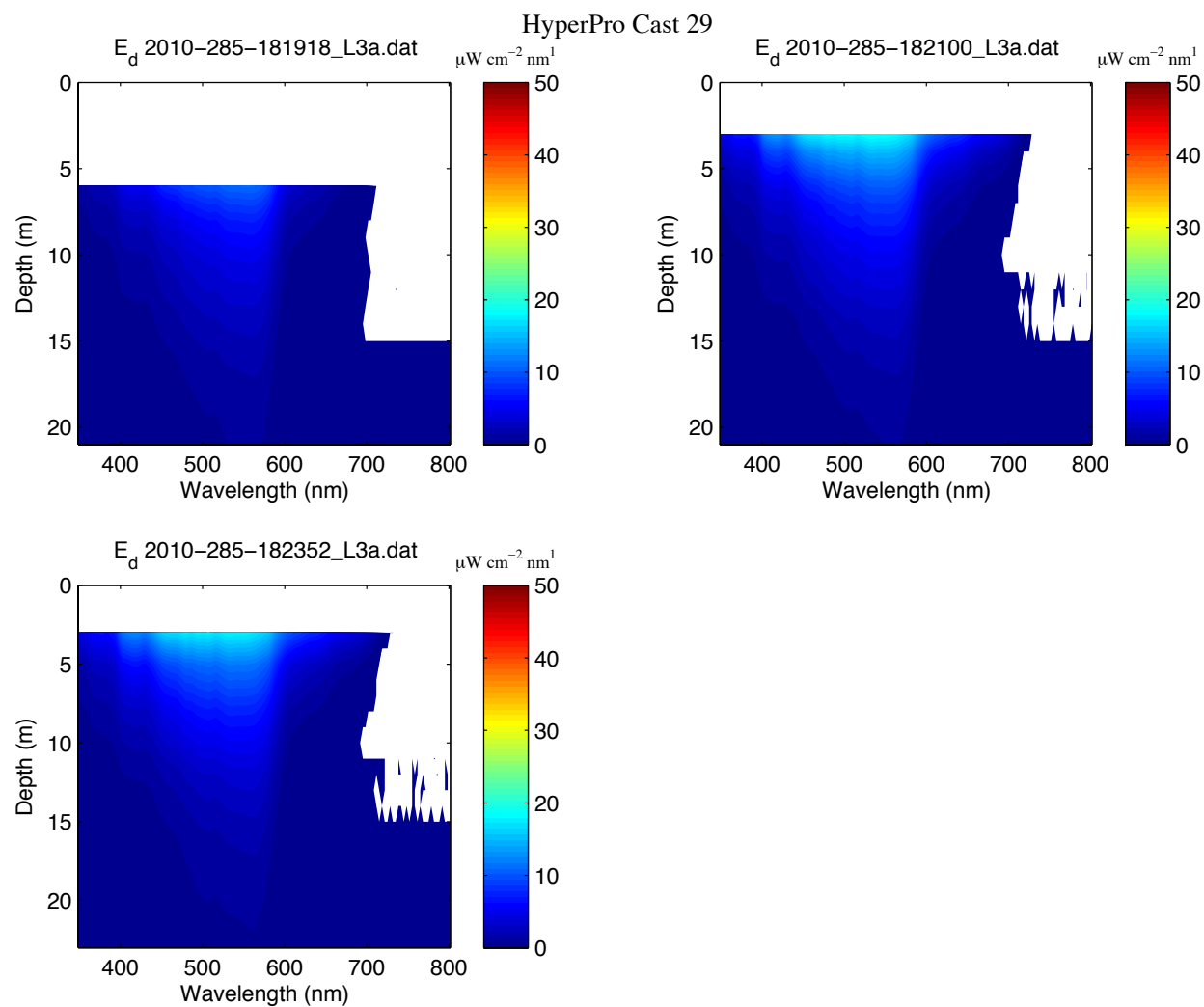
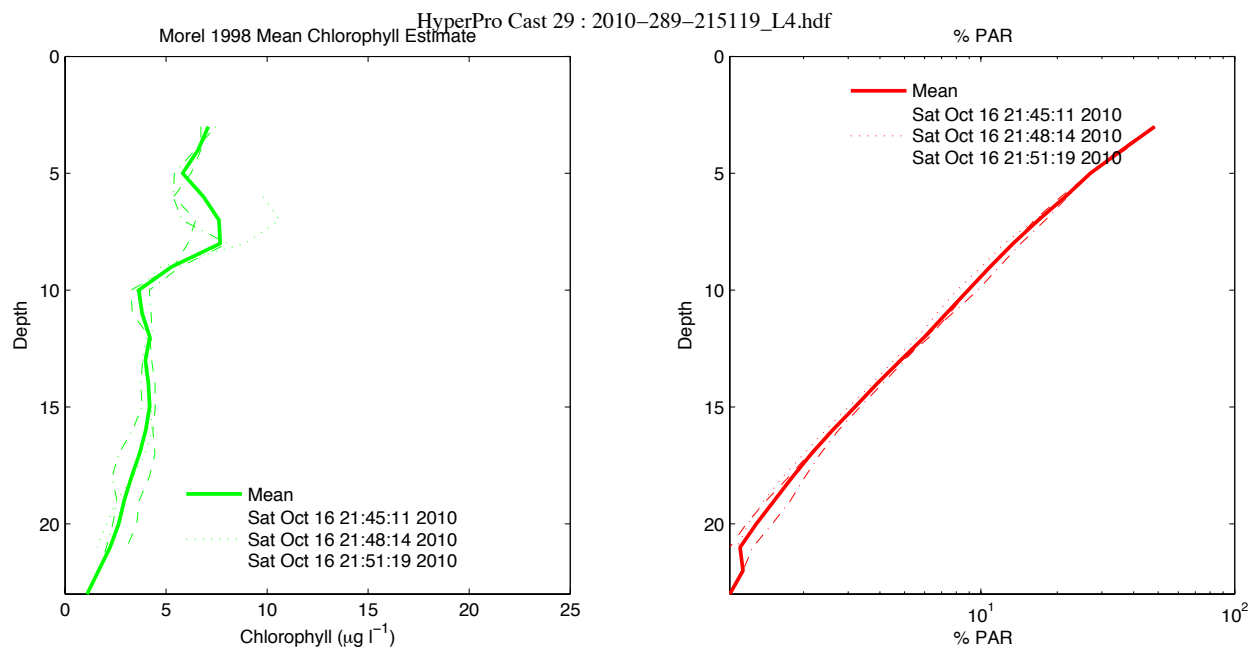
TSS



MVSM



HyperPro

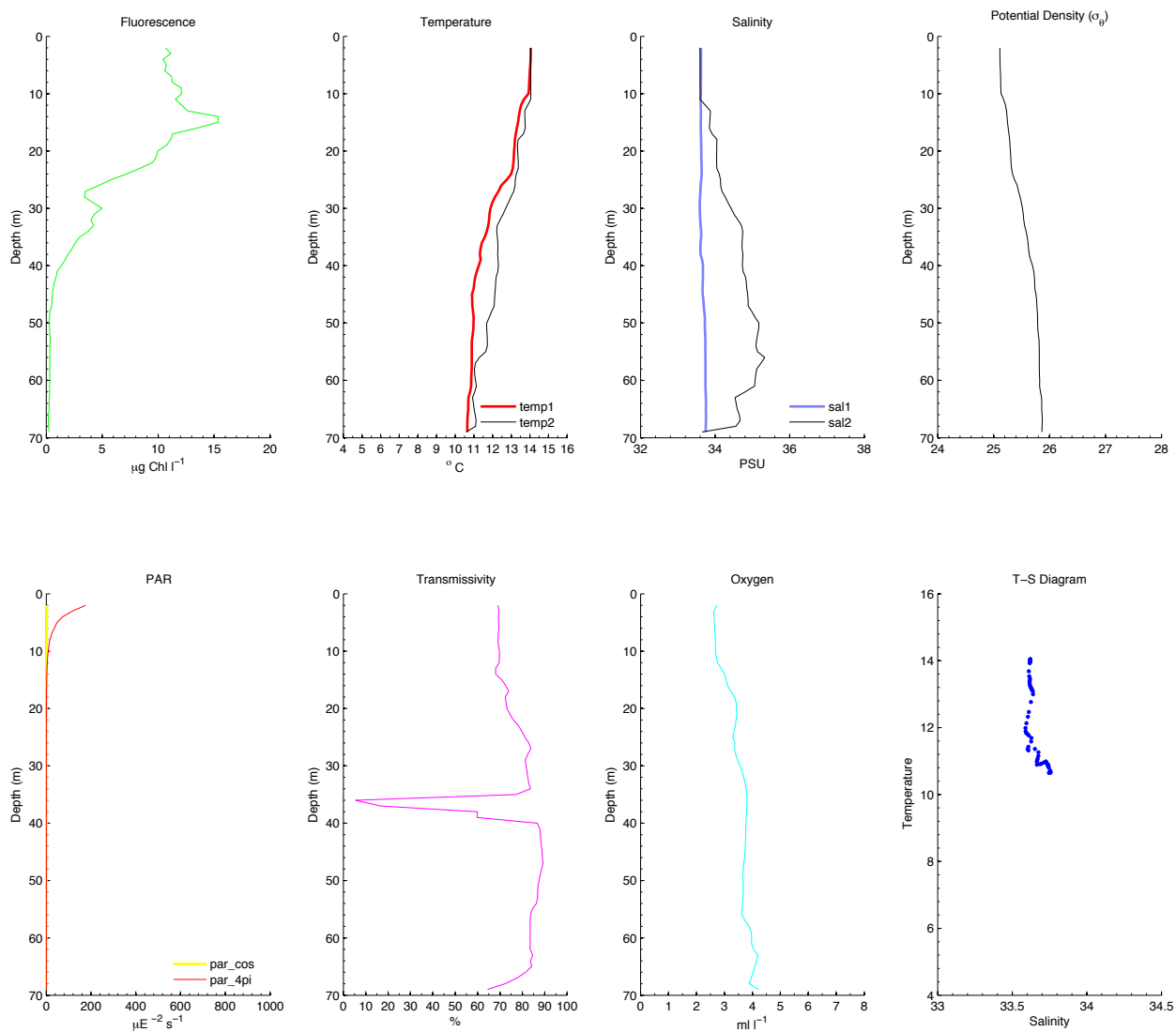


Cast 30 (1602 PDT; [Station BS33](#))

(near MBARI mooring M0 - took 3 surface bottles) (mostly overcast, some patches of blue)

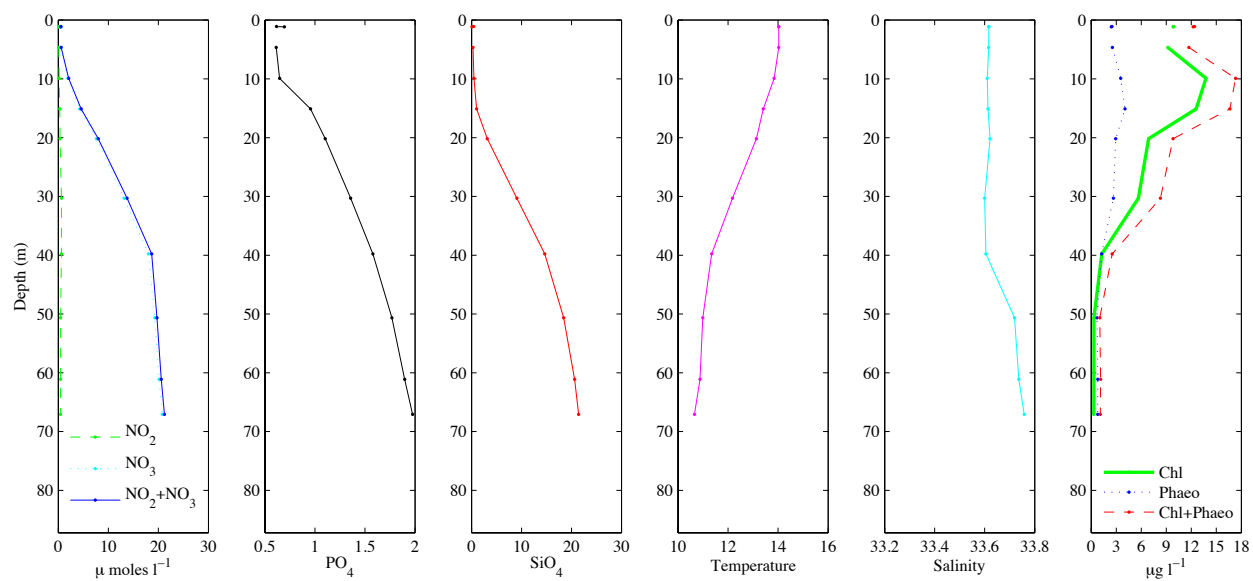
CTD

BIOSPACE 2010 Cast 30 (CTD33; 2010-10-16 22:57:00.000 UTC) CTD Downcast Data (Calibrated)



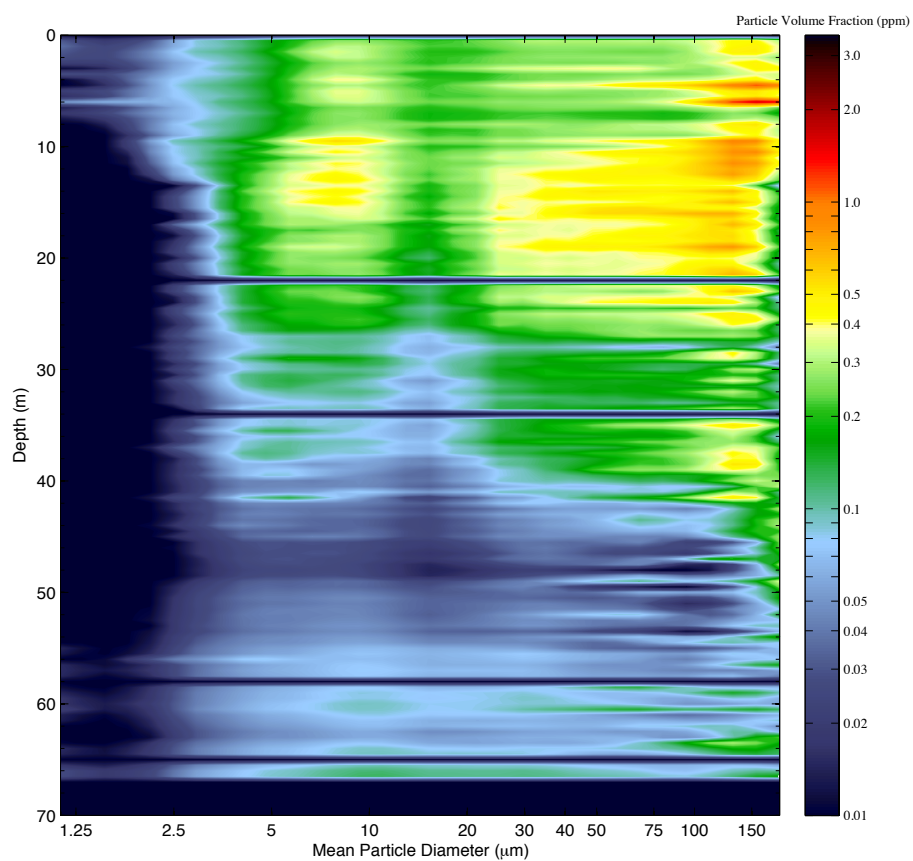
Bottle Nutrients and Chlorophyll

BIOSPACE 2010 Cast 30

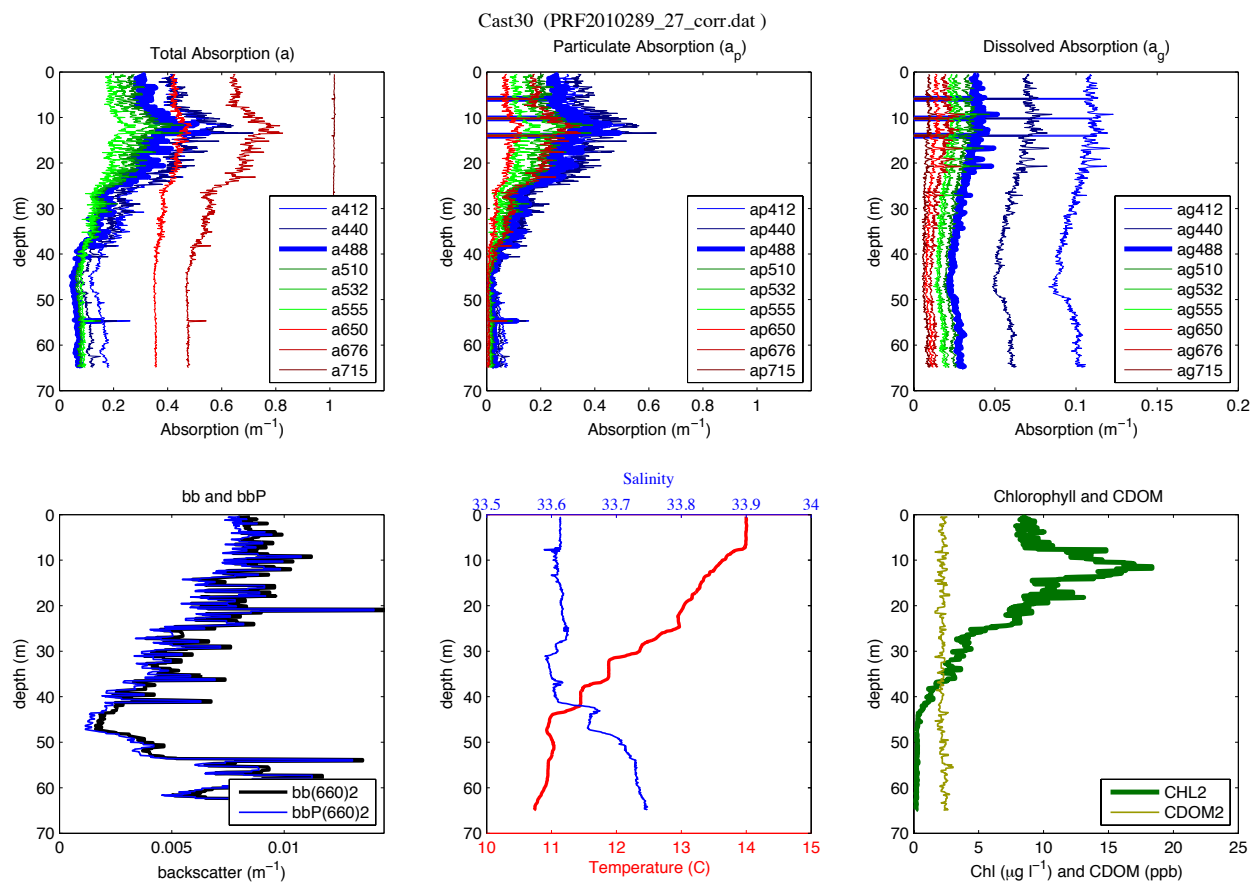


LISST

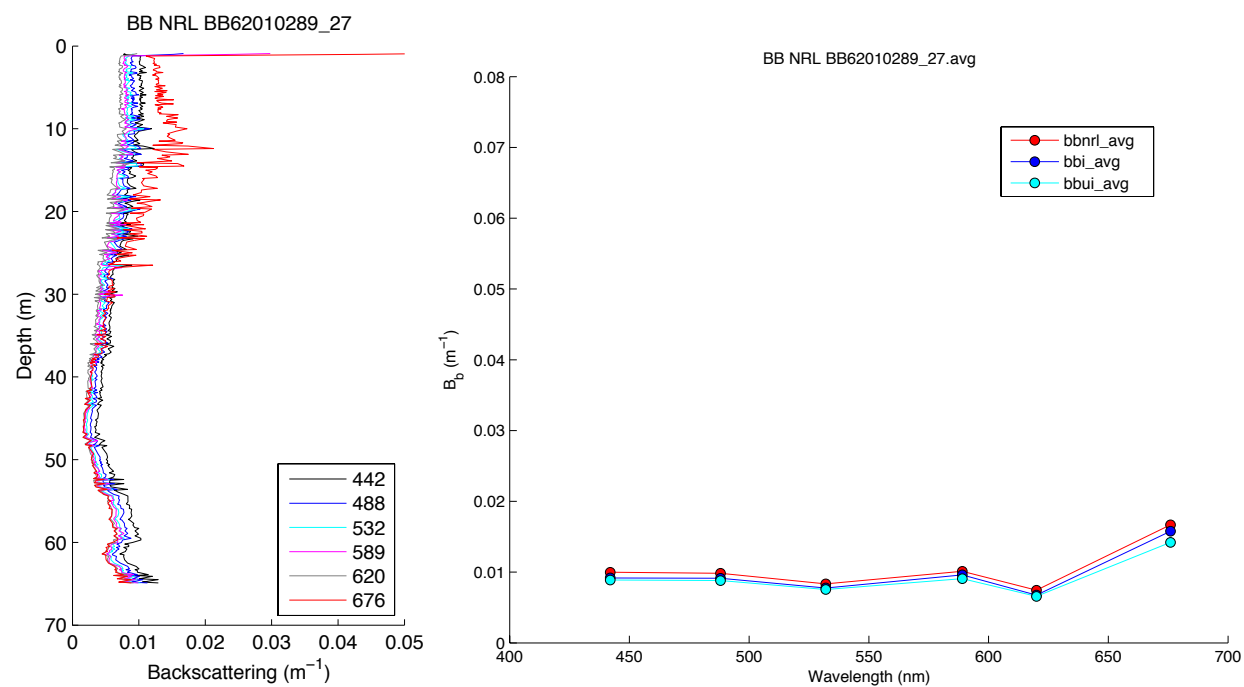
LISST – Cast 30



Optics Profile Package

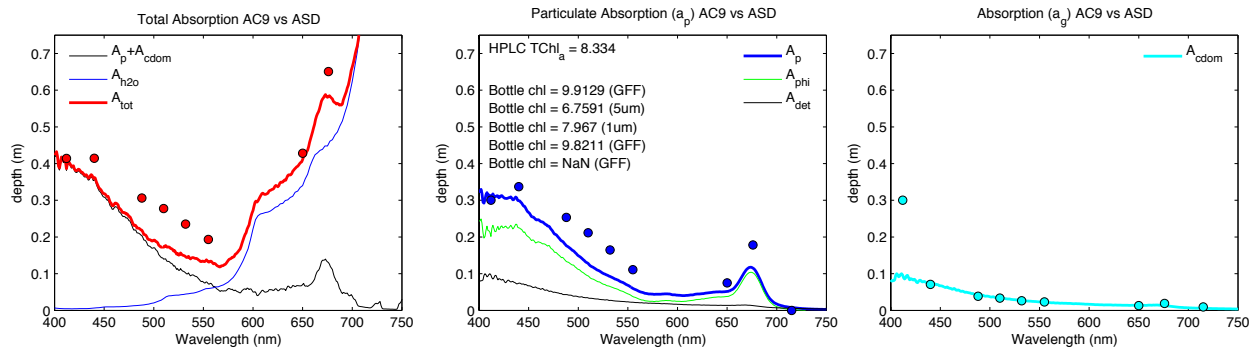


HydroScat

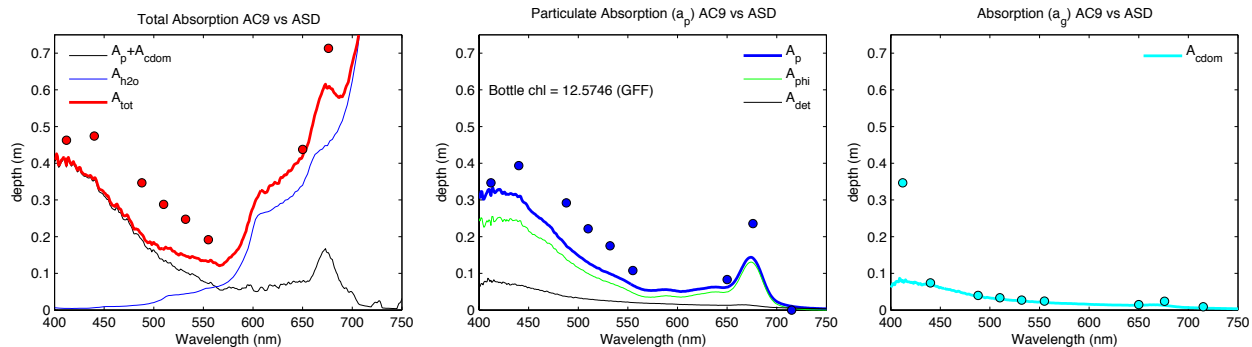


Filter Pad Absorption (w/ AC9)

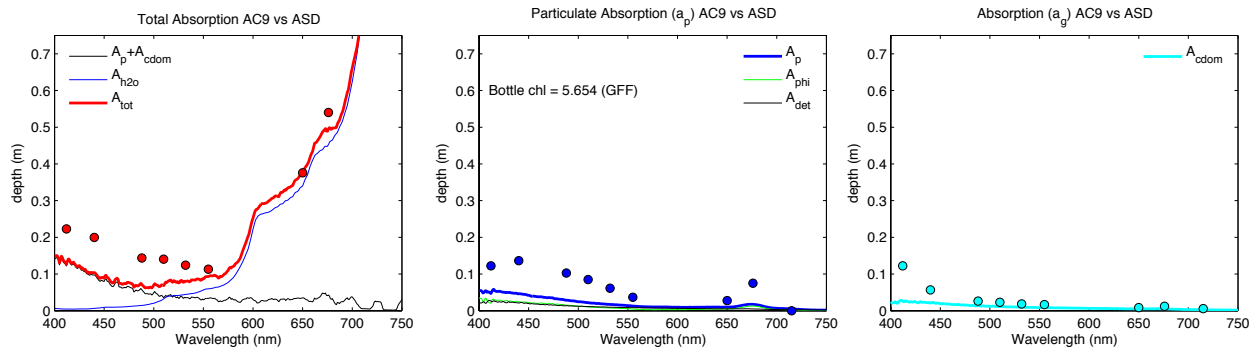
AC9 vs ASD Cast 30 – 0m (PRF2010289_27_corr.dat) CTD 30



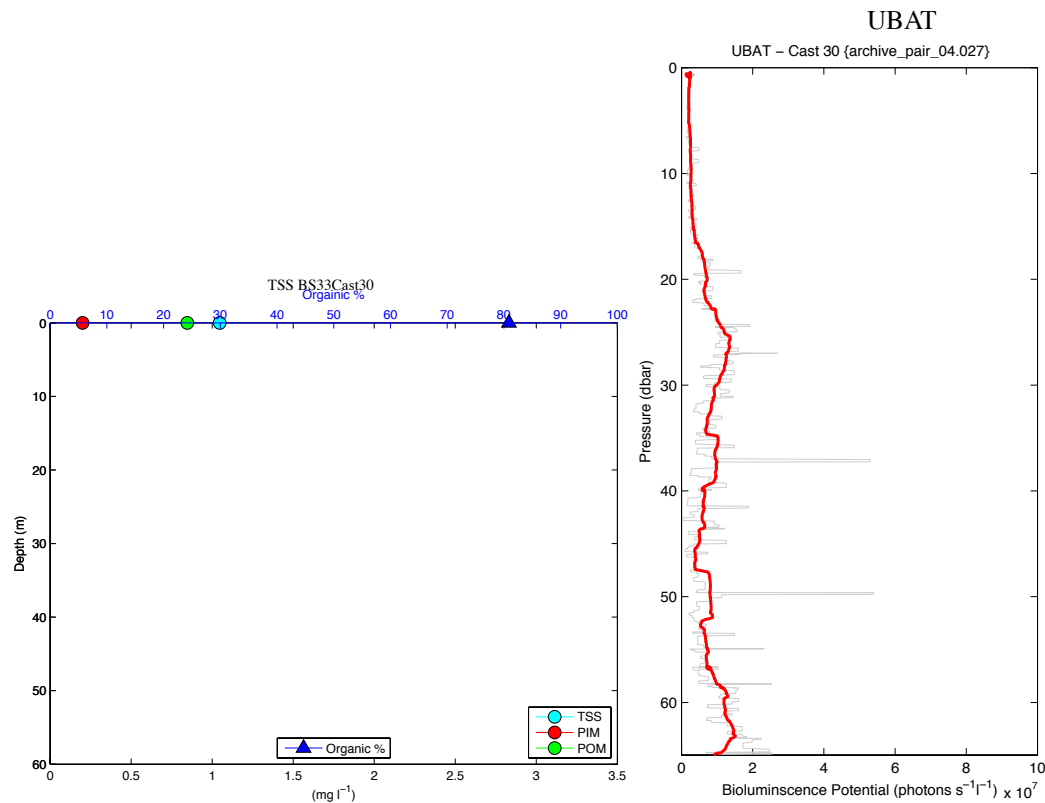
AC9 vs ASD Cast 30 – 15m (PRF2010289_27_corr.dat) CTD 30



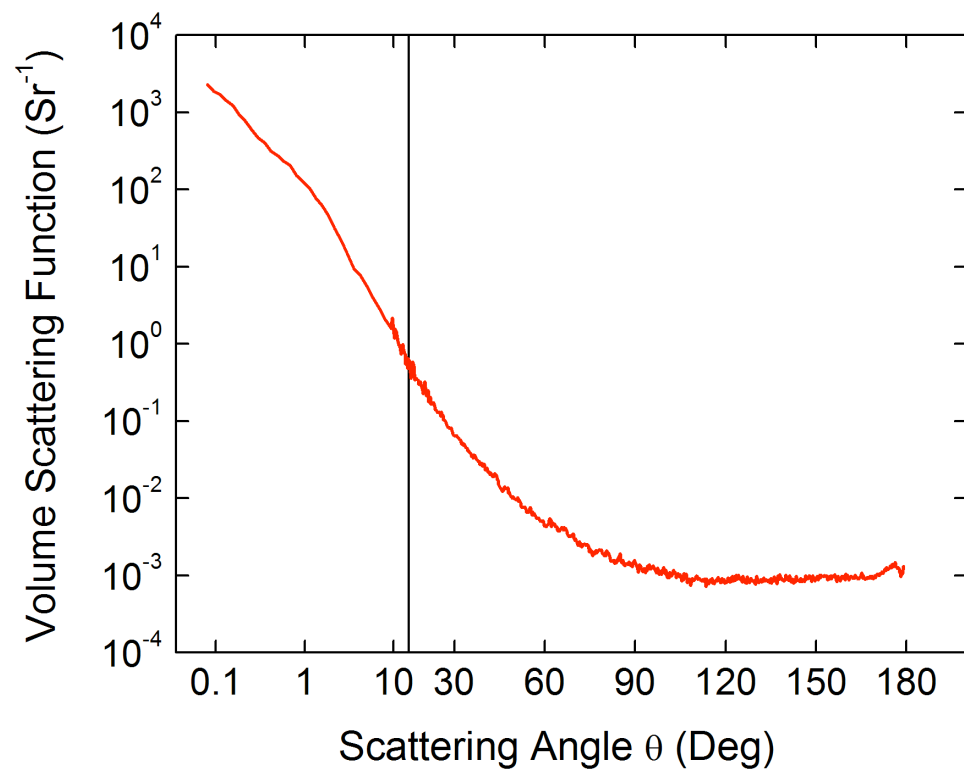
AC9 vs ASD Cast 30 – 30m (PRF2010289_27_corr.dat) CTD 30



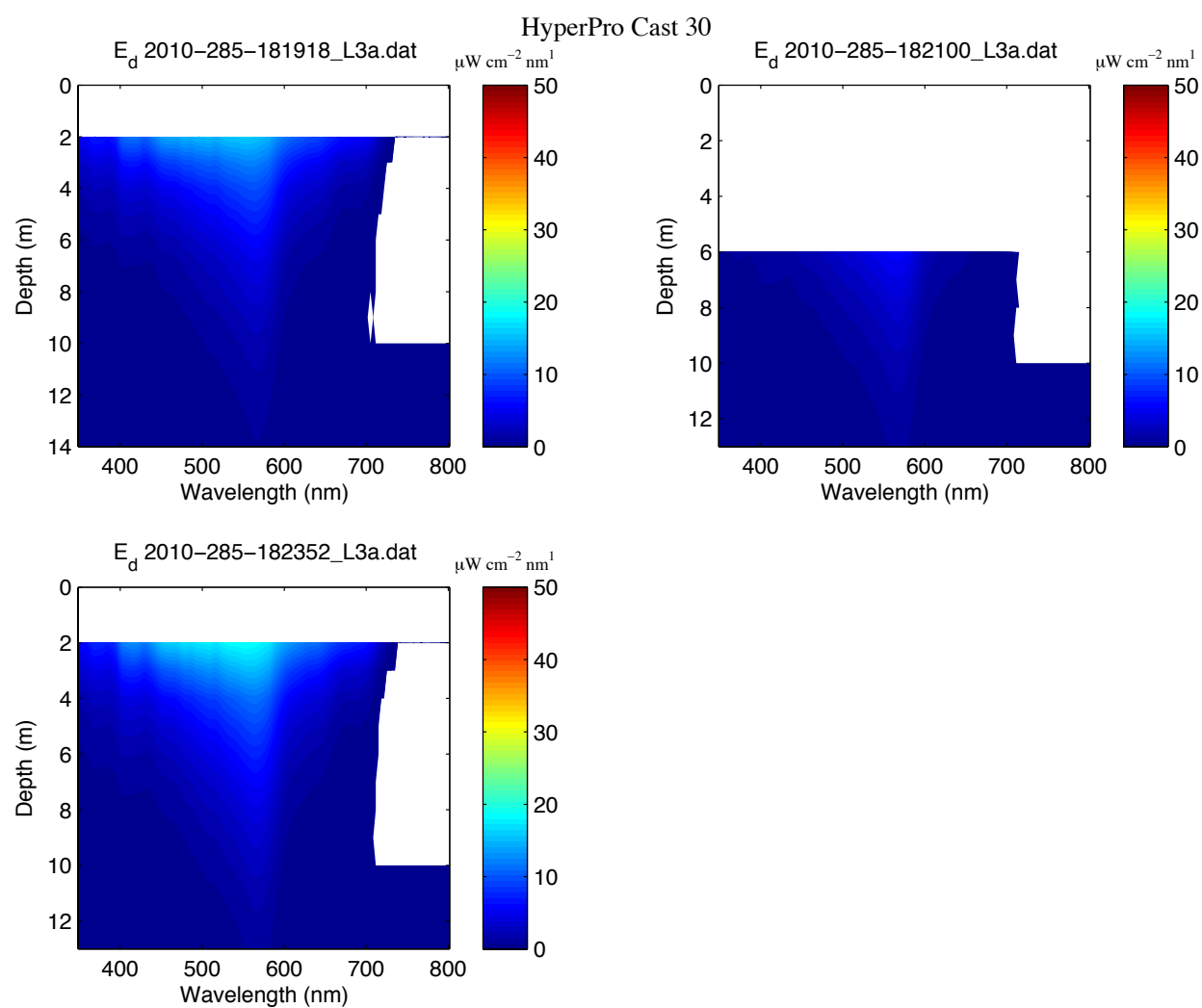
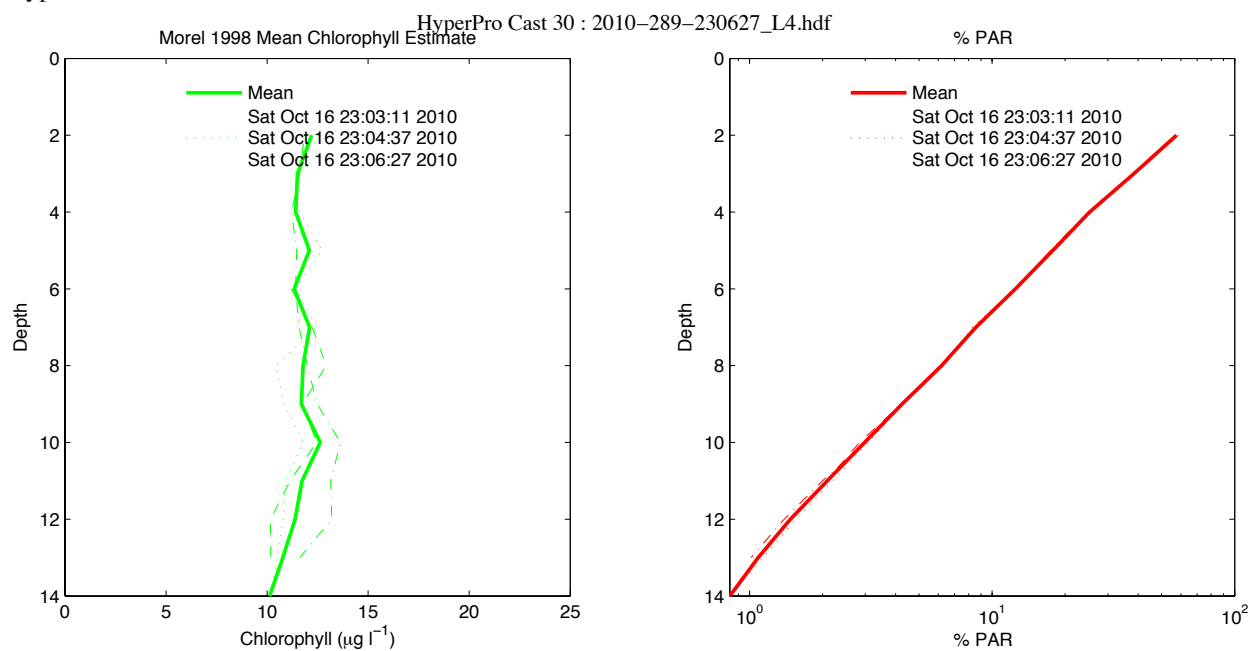
TSS



MVSM



HyperPro

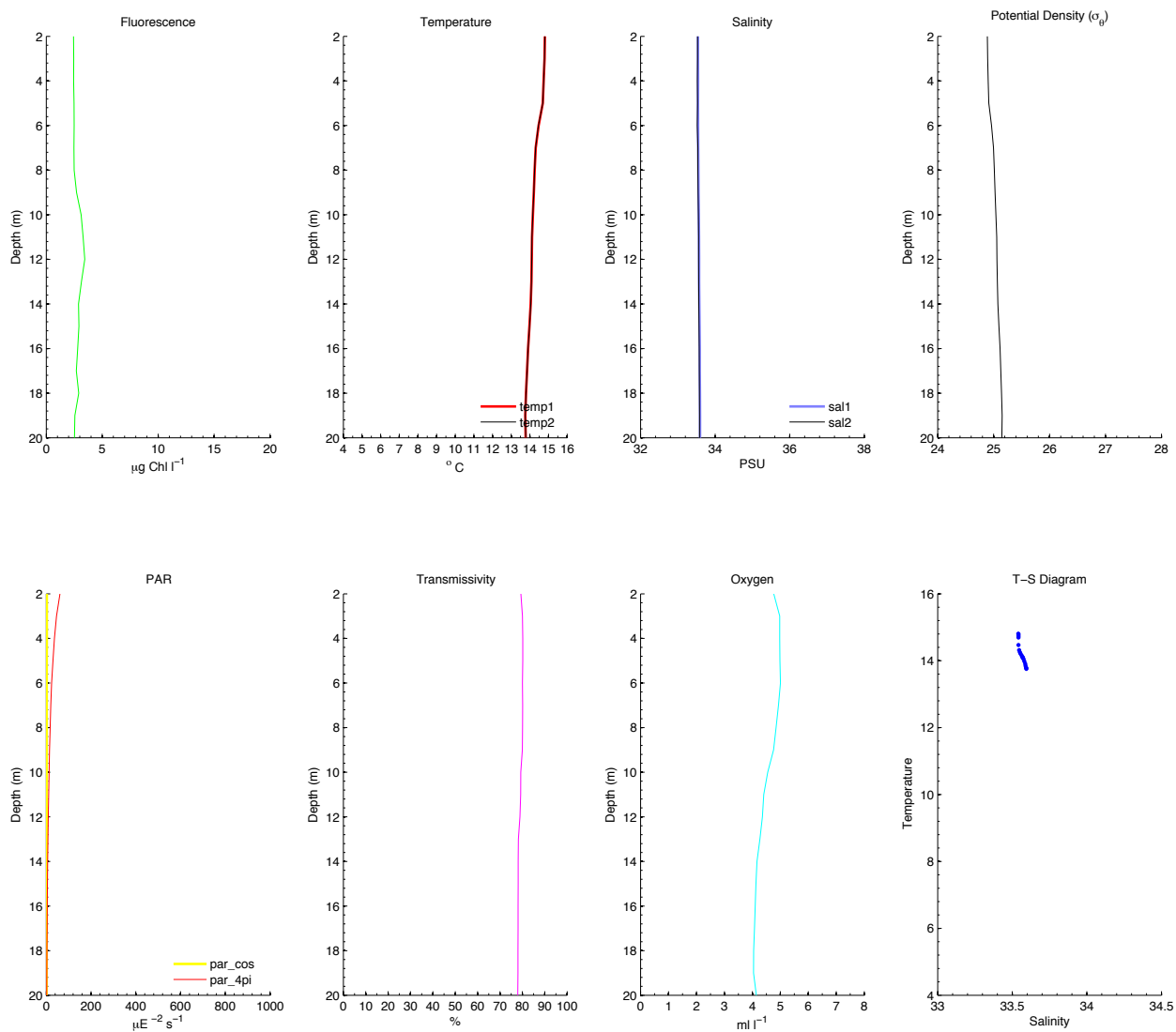


Cast 31 (1731 PDT; [Station BS02](#))

(mostly overcast, some patches of blue, twilight)

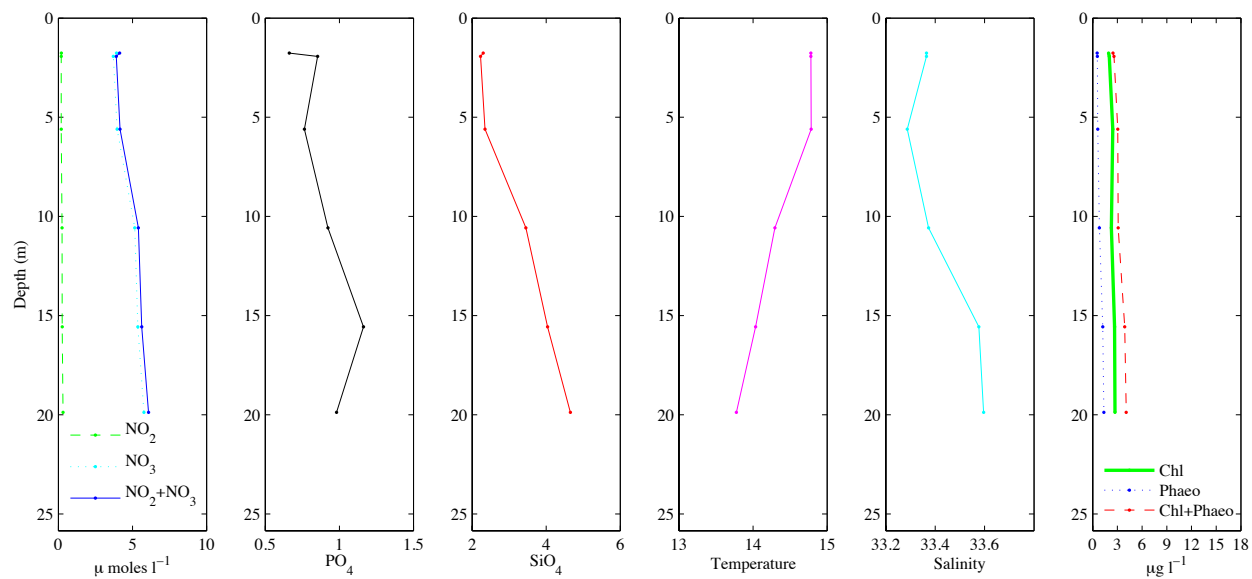
CTD

BIOSPACE 2010 Cast 31 (CTD02; 2010-10-17 00:35:00.000 UTC) CTD Downcast Data (Calibrated)



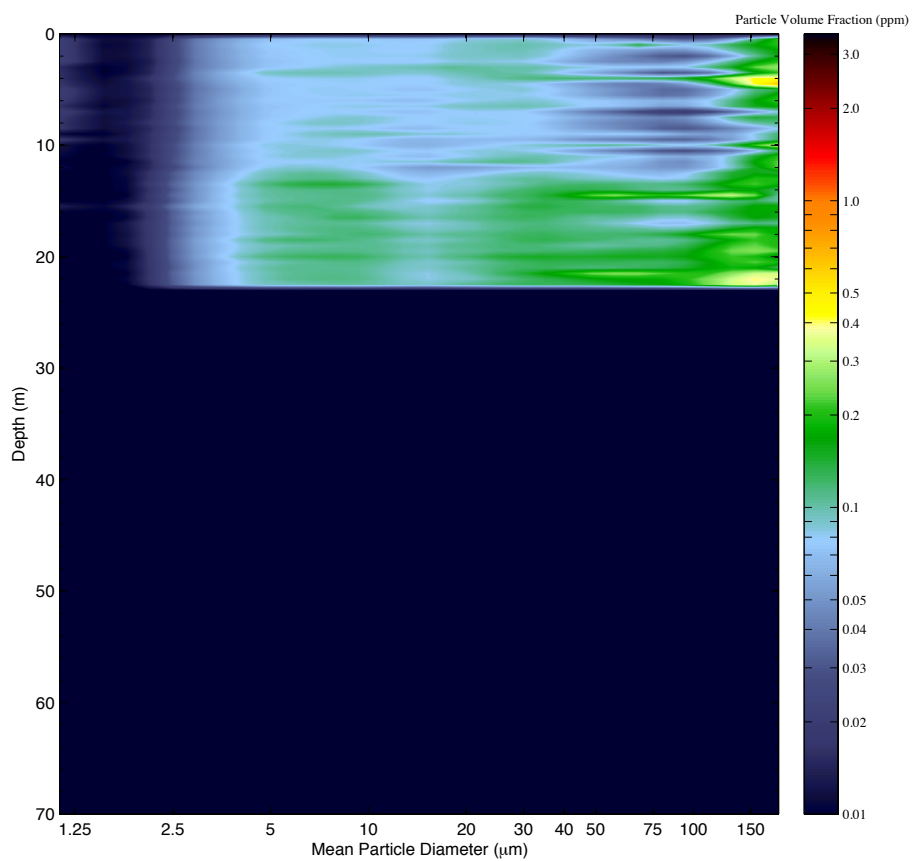
Bottle Nutrients and Chlorophyll

BIOSPACE 2010 Cast 31

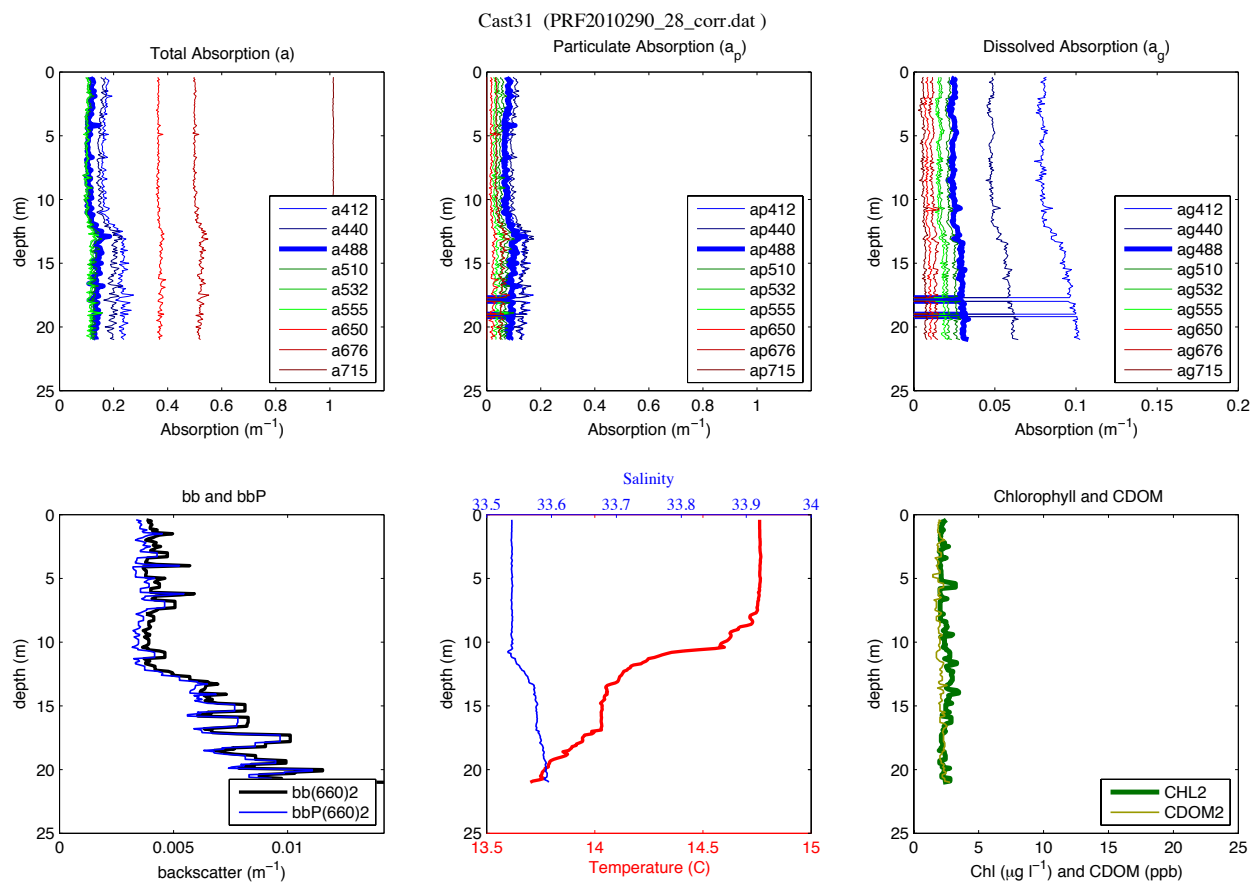


LISST

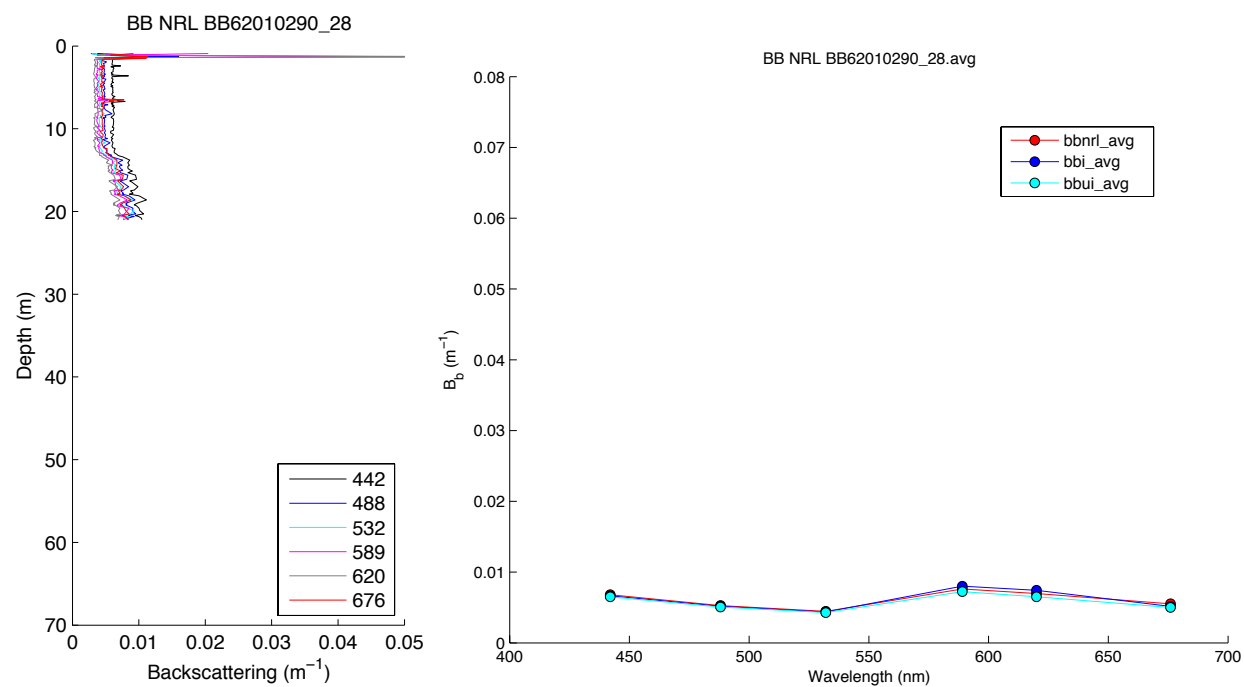
LISST – Cast 31



Optics Profile Package

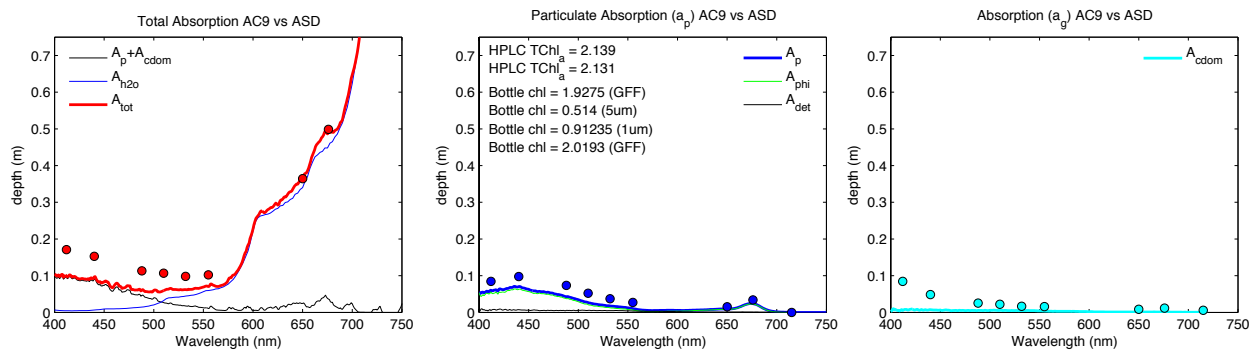


HydroScat

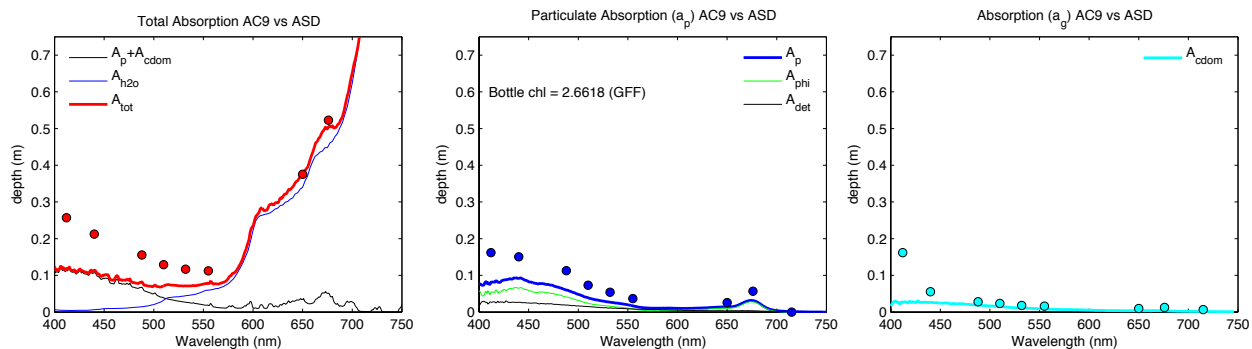


Filter Pad Absorption (w/ AC9)

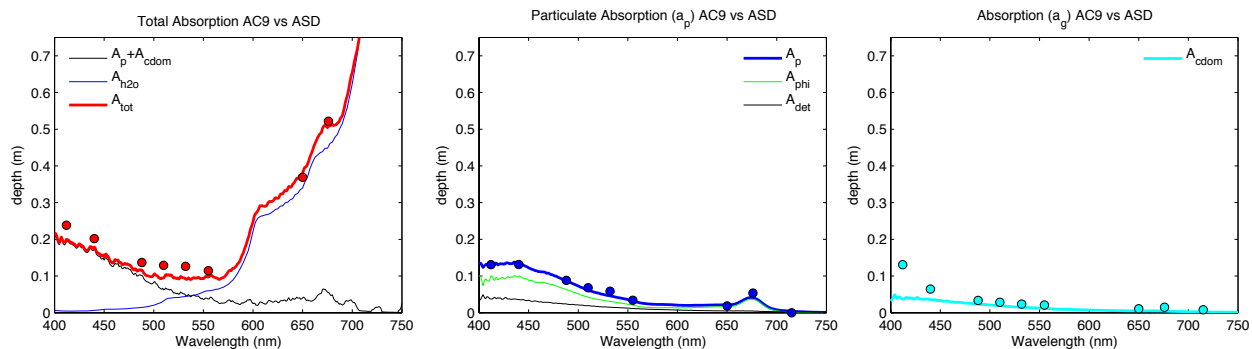
AC9 vs ASD Cast 31 – 0m (PRF2010290_28_corr.dat) CTD 06



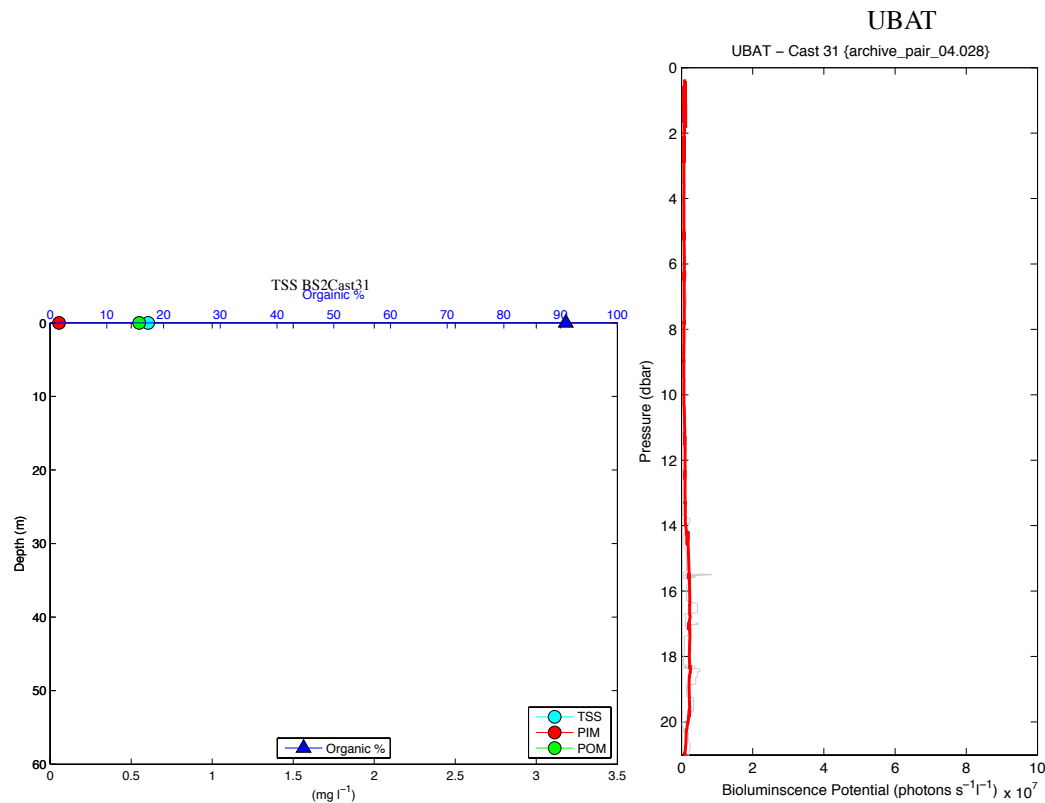
AC9 vs ASD Cast 31 – 15m (PRF2010290_28_corr.dat) CTD 06



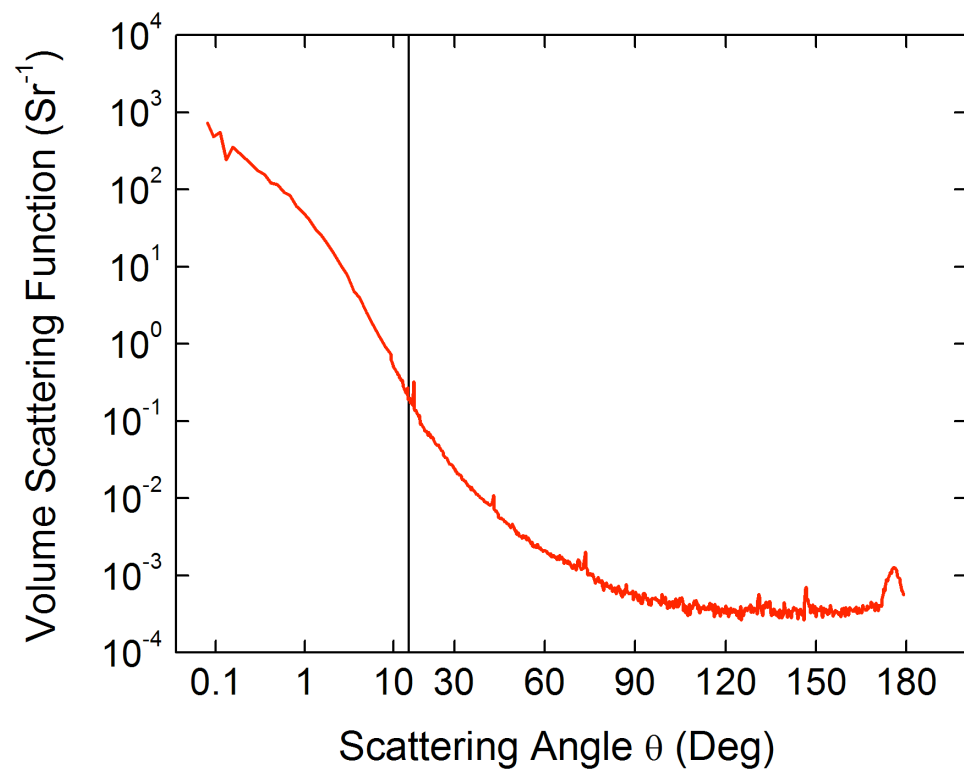
AC9 vs ASD Cast 31 – 40m (PRF2010290_28_corr.dat) CTD 06



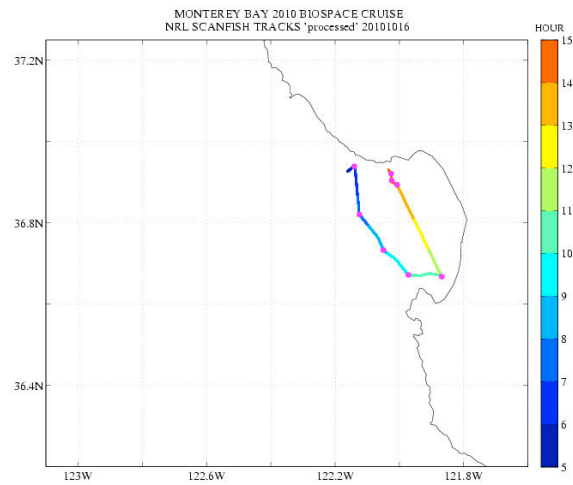
TSS



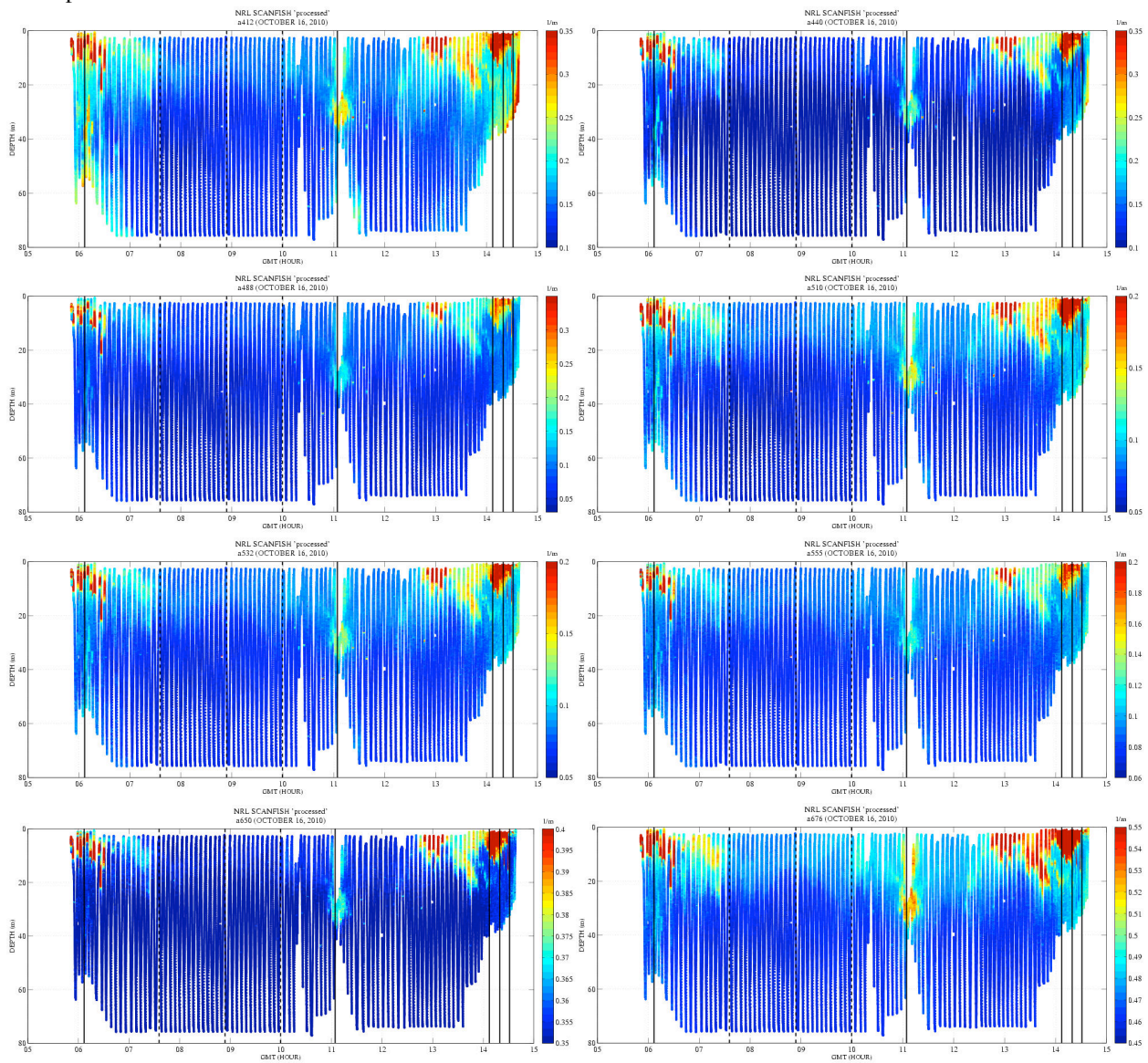
MVSM

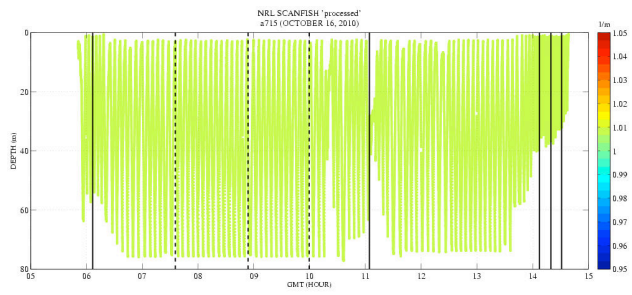


Scanfish Survey

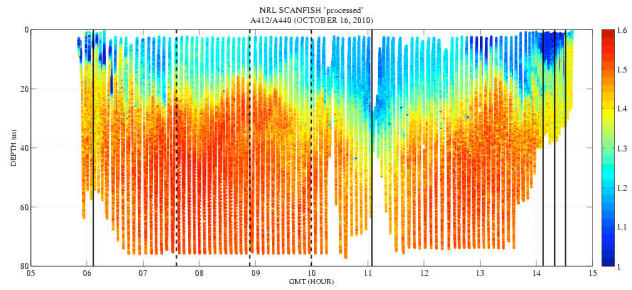


Absorption

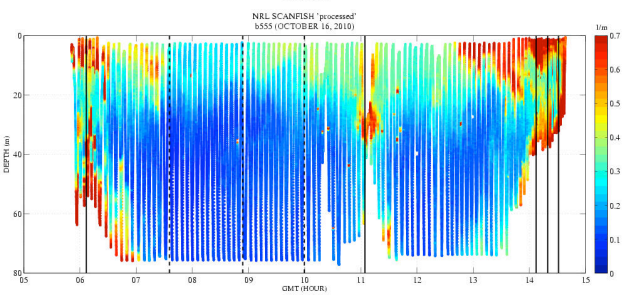
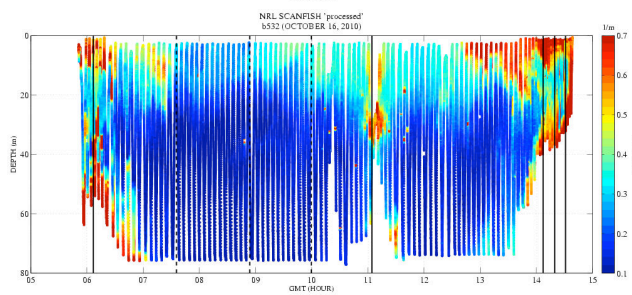
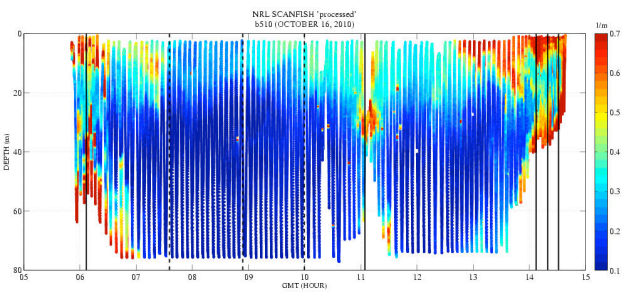
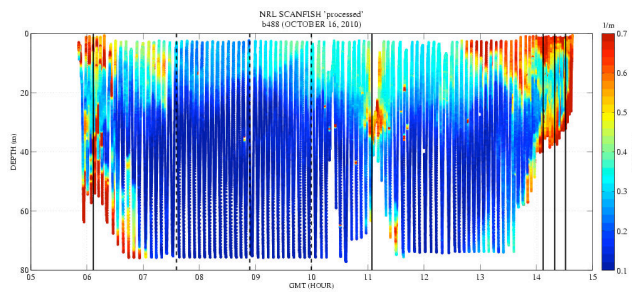
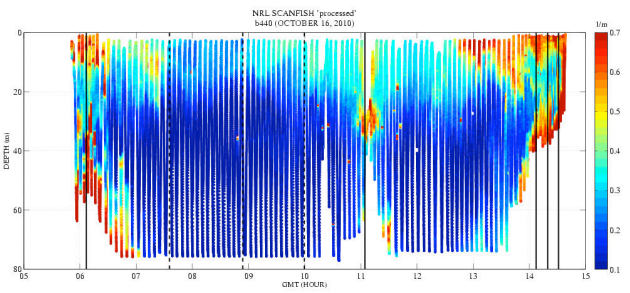
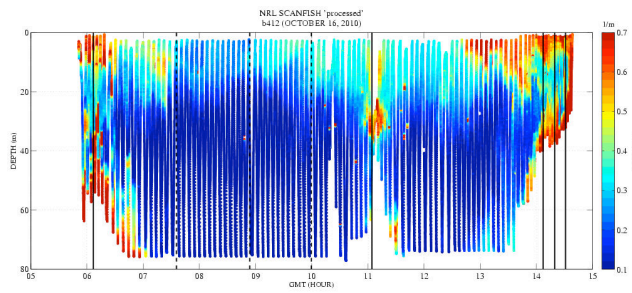


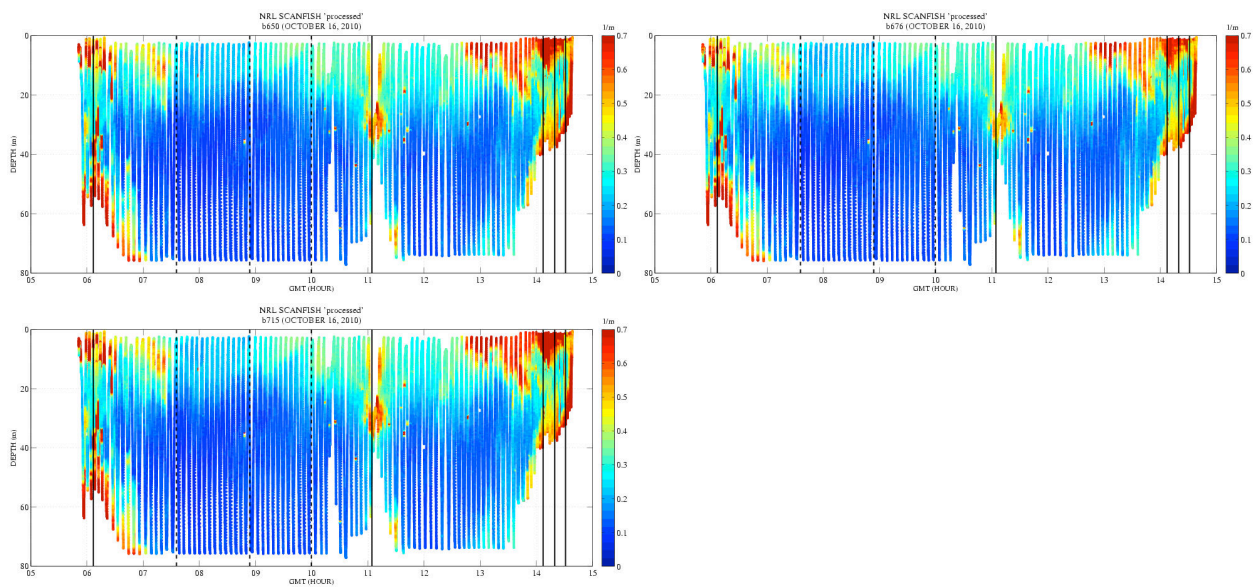


A412:A440

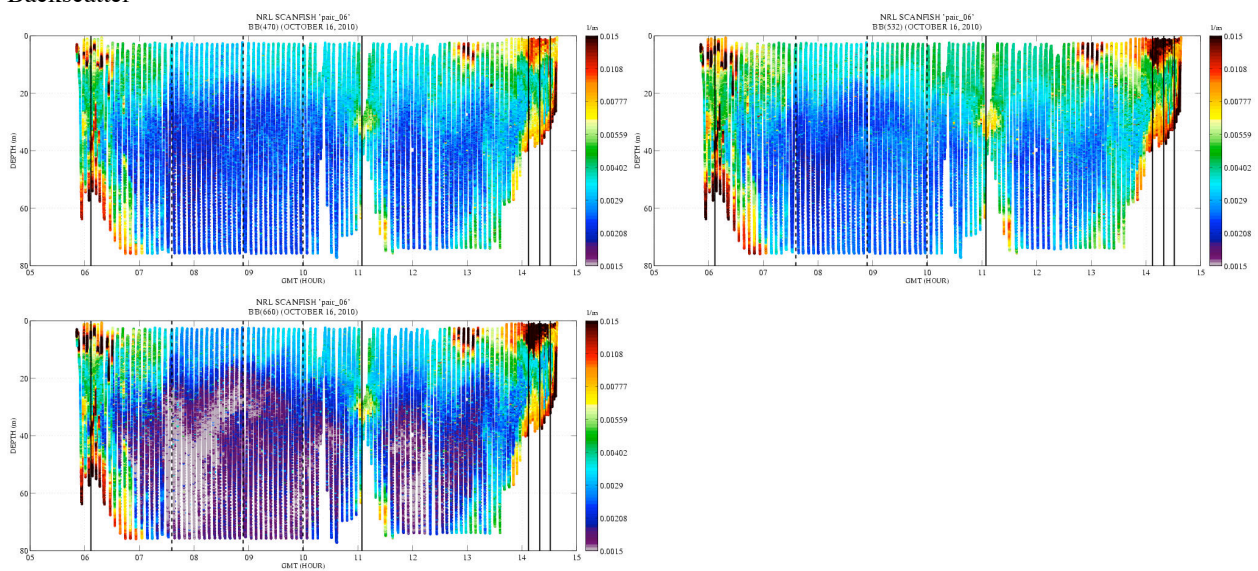


Backscatter

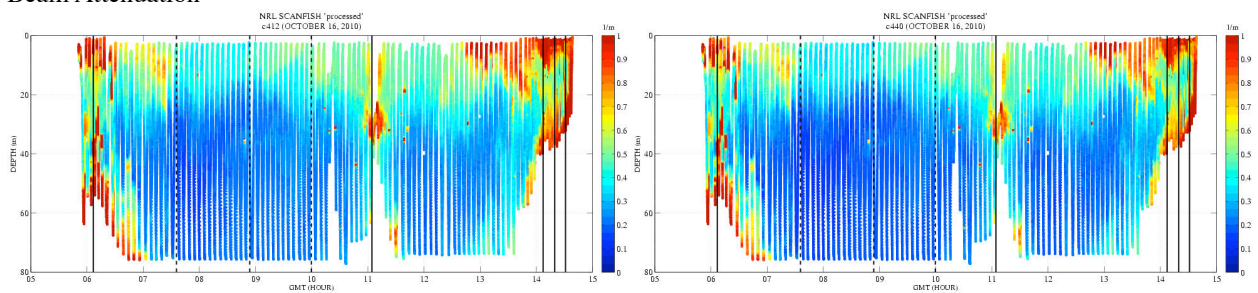


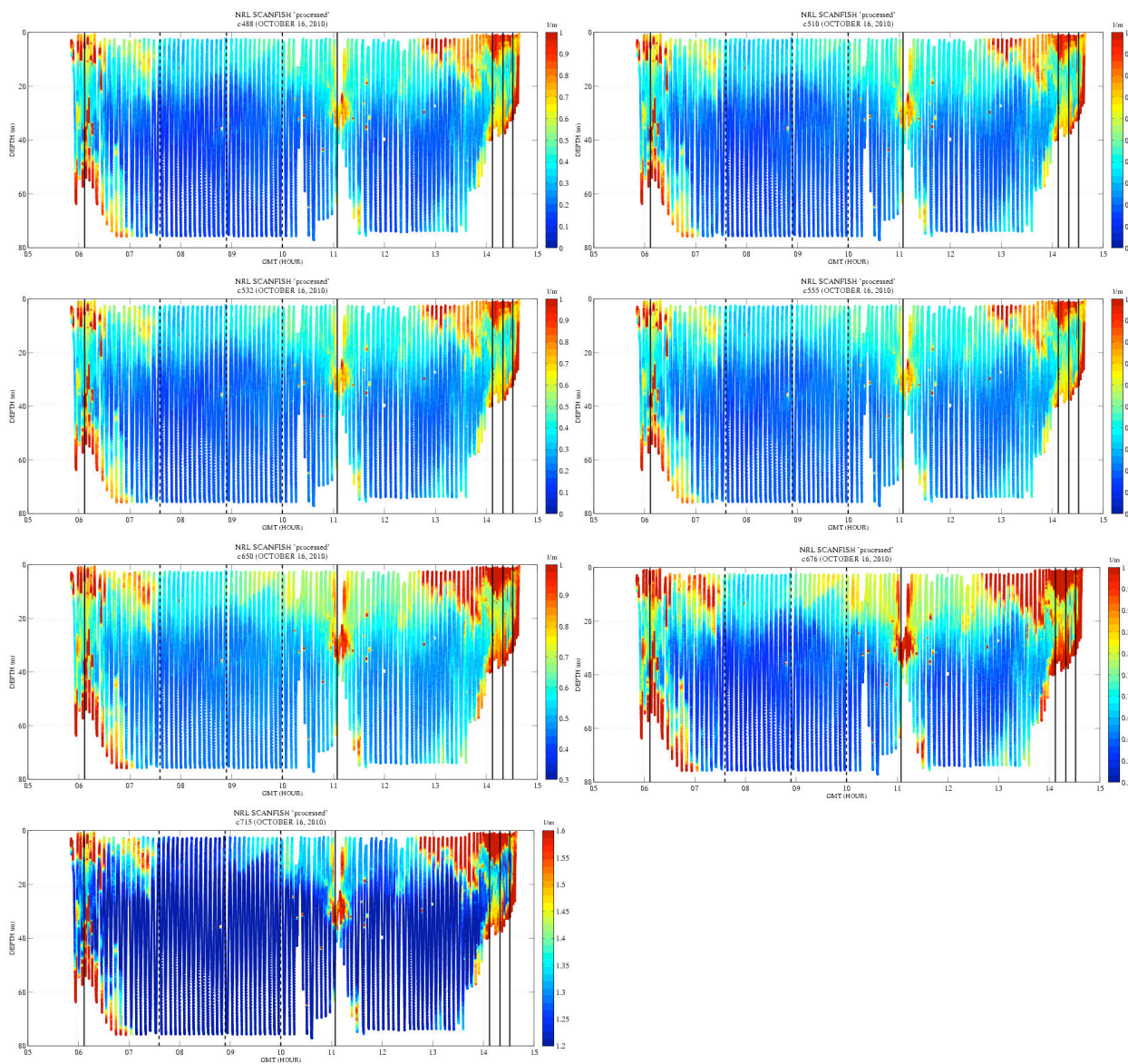


Backscatter

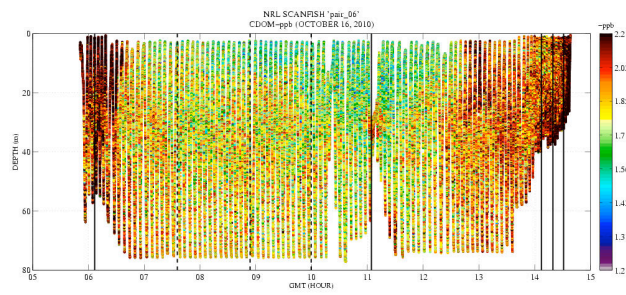


Beam Attenuation

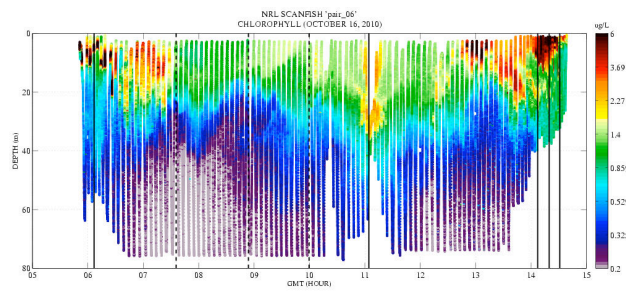




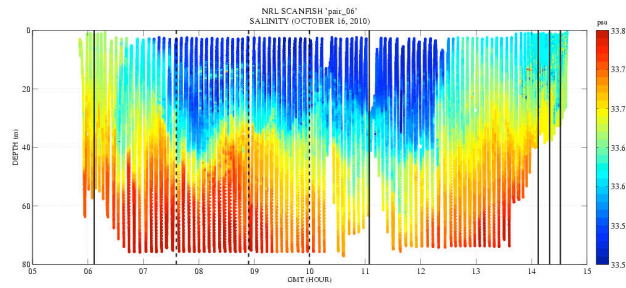
CDOM



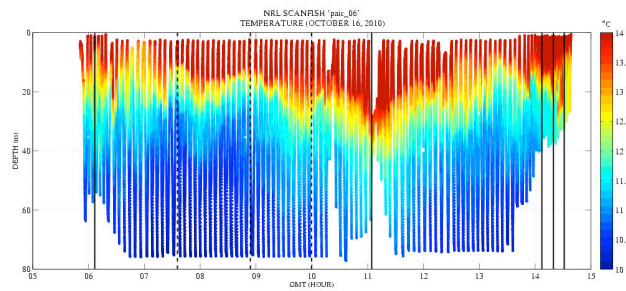
Chlorophyll



Salinity



Temperature



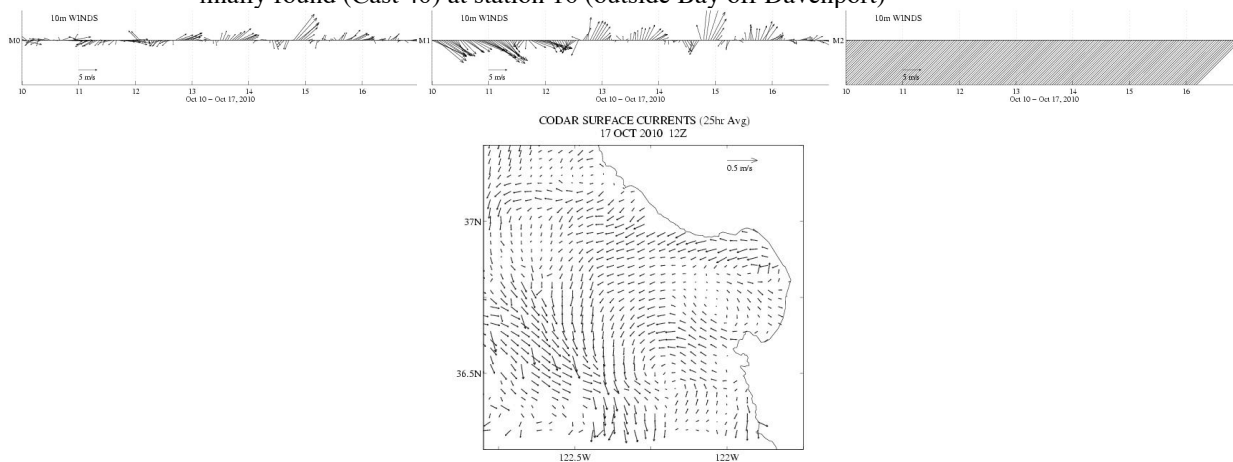
10/17

(upwelling) “First flush” rain event. *Prorocentrum micans* bloom pushed out of MB (biospace)

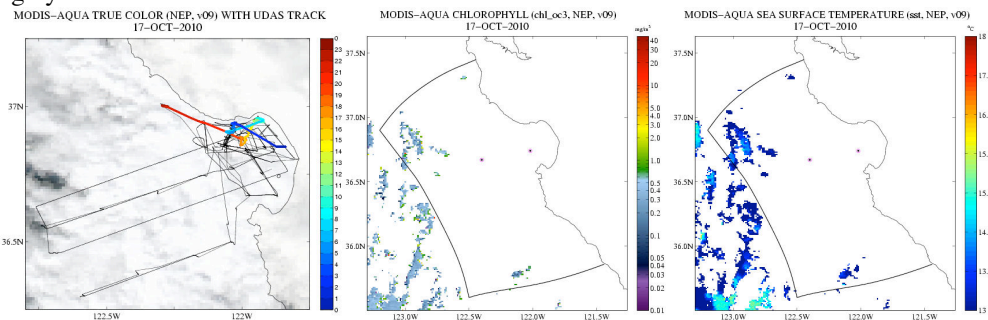
Casts 32 - 43 “the Great Dino Hunt”

Dinos not found at previous location (off Santa Cruz)

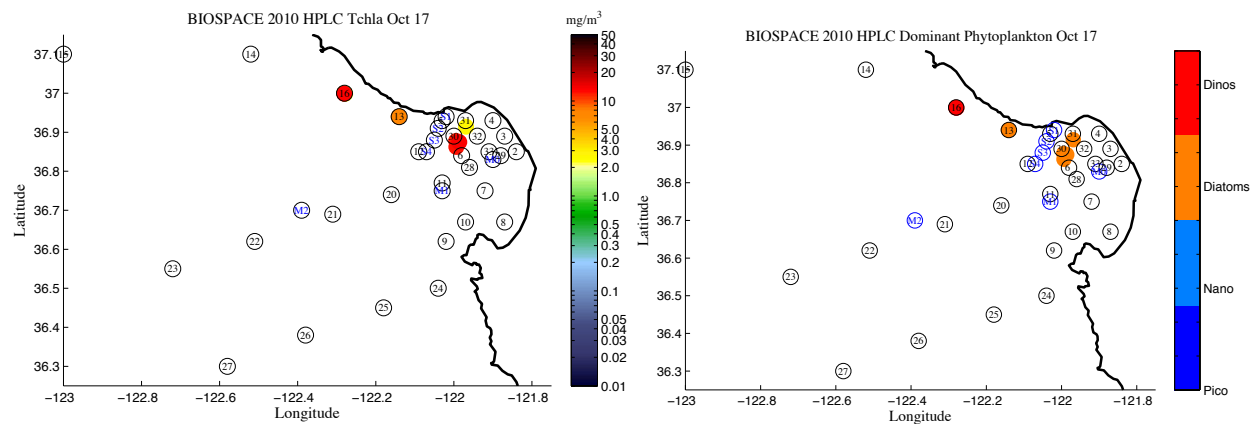
finally found (Cast 40) at station 16 (outside Bay off Davenport)



Satellite Imagery



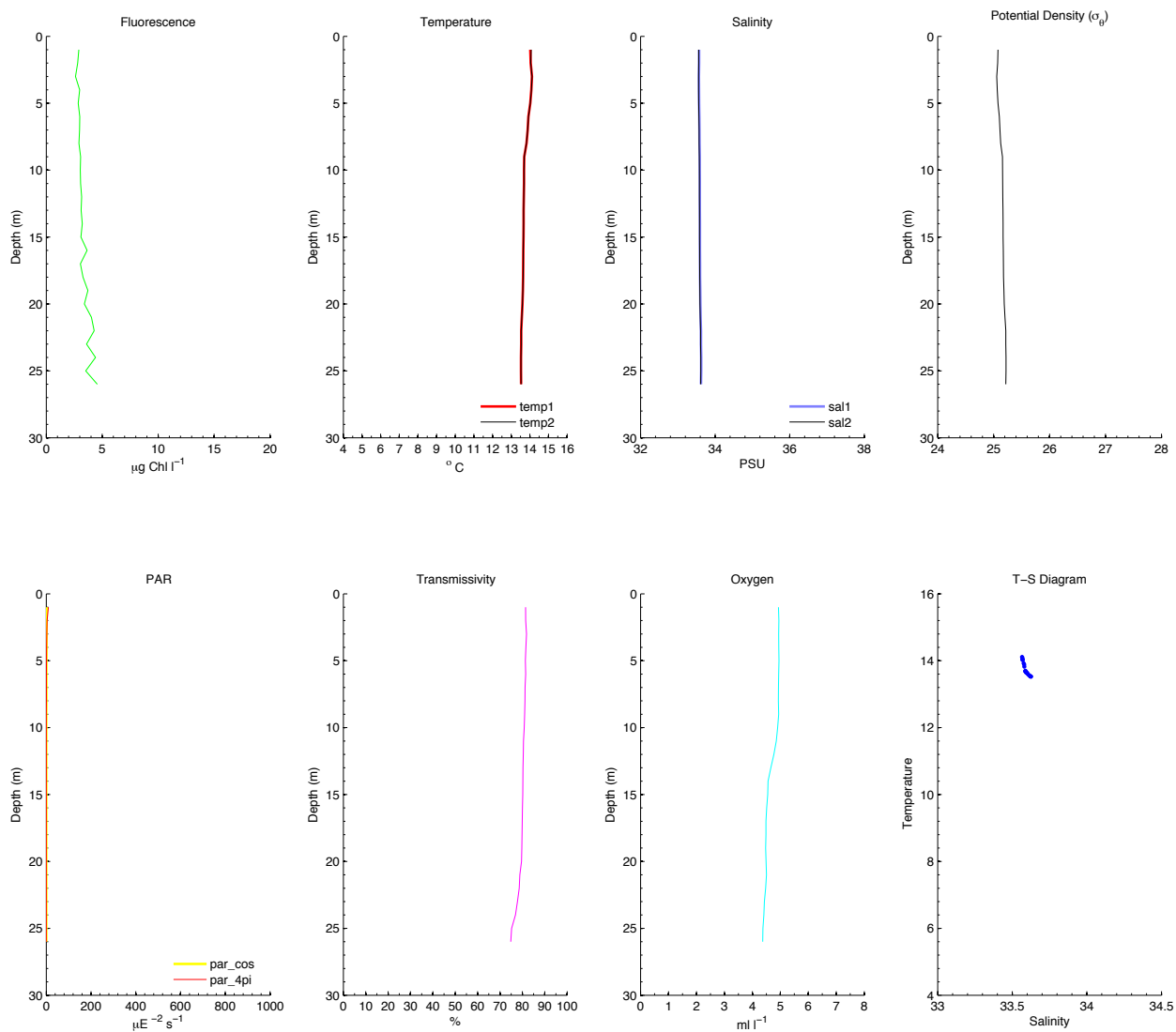
HPLC



Cast 32 (0650 PDT)
 (missed patch -no water samples) (overcast, dark (pre-dawn))

CTD

BIOSPACE 2010 Cast 32 (TimeSeries1; 2010-10-17 13:52:16.000 UTC) CTD Downcast Data (Calibrated)

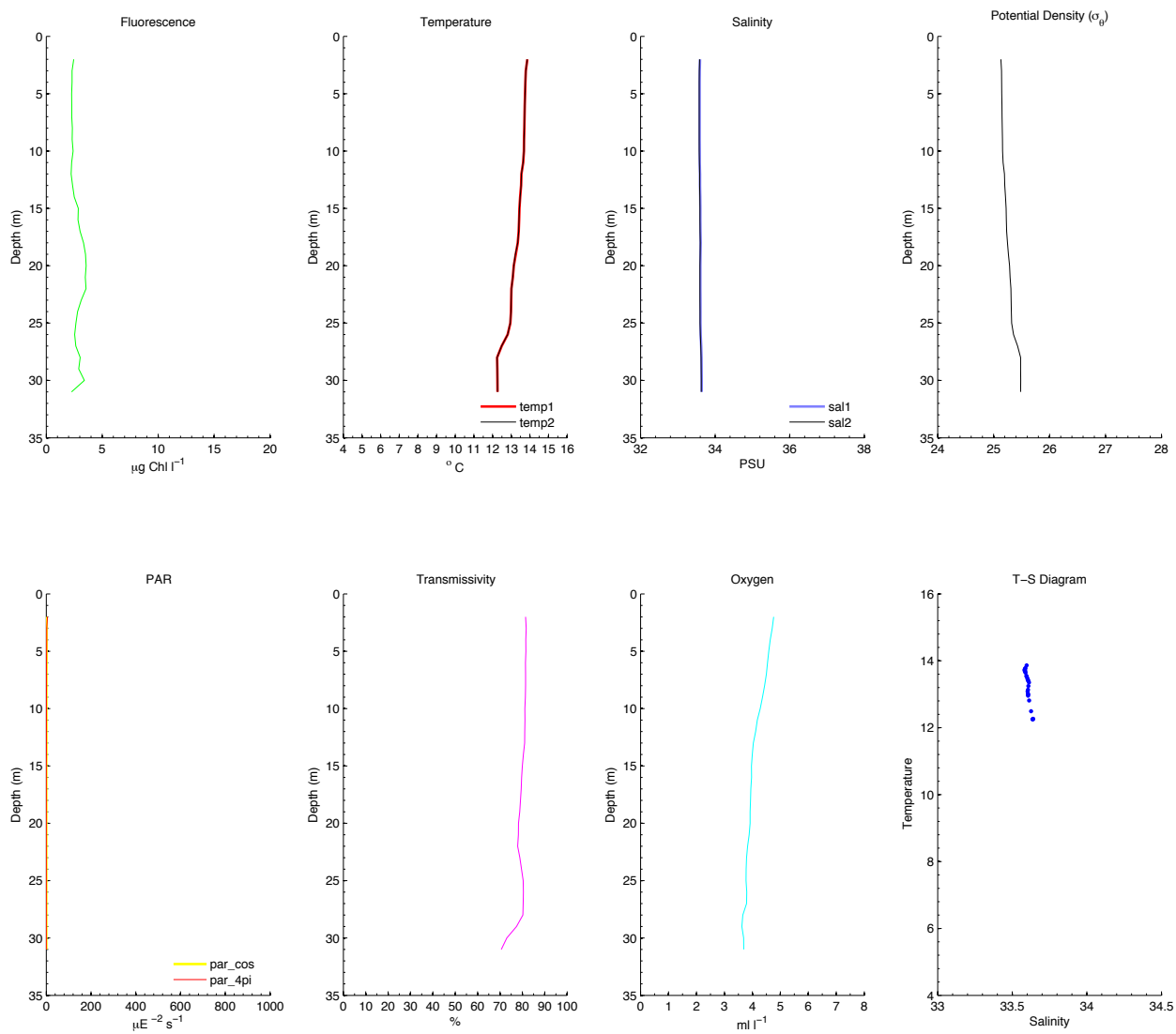


Cast 33 (0730 PDT)

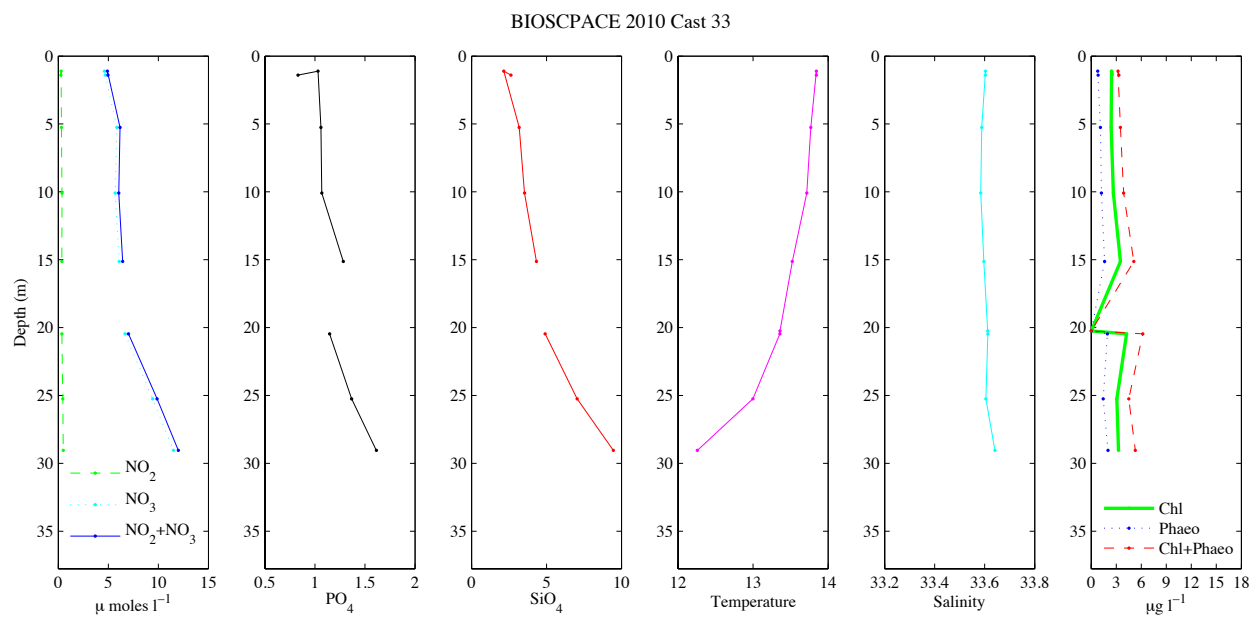
(20m-water through phyto net>microscope>some *pseudo-nitzschia*) (overcast, sunrise)

CTD

BIOSPACE 2010 Cast 33 (TimeSeries2; 2010-10-17 14:34:00.000 UTC) CTD Downcast Data (Calibrated)

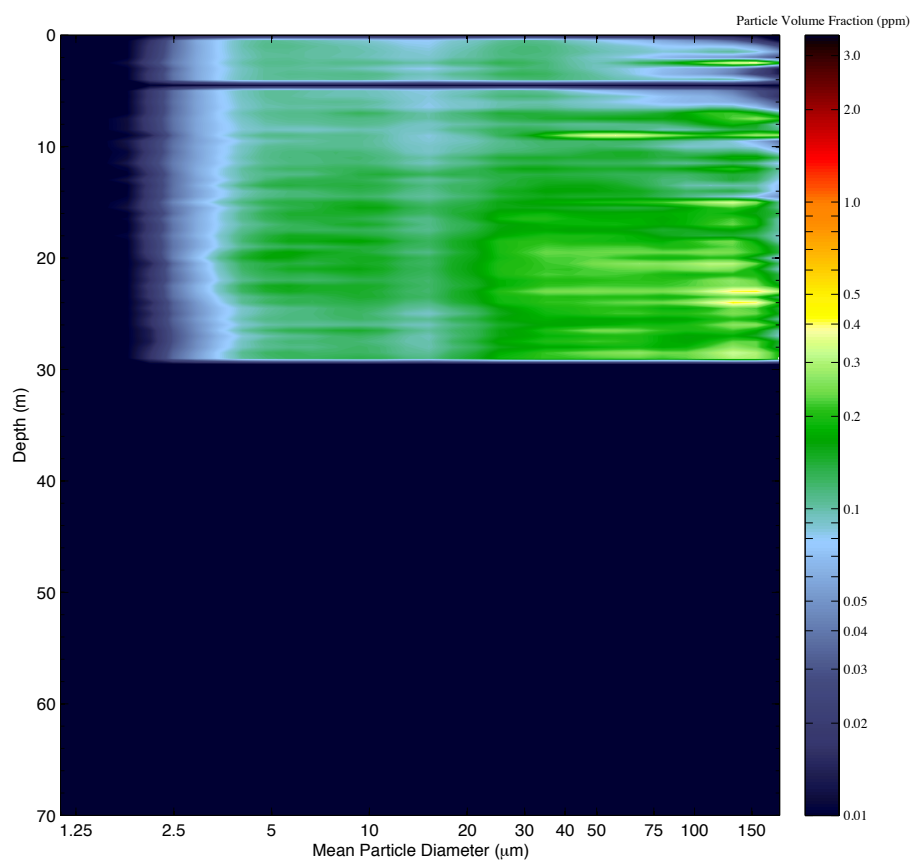


Bottle Nutrients and Chlorophyll

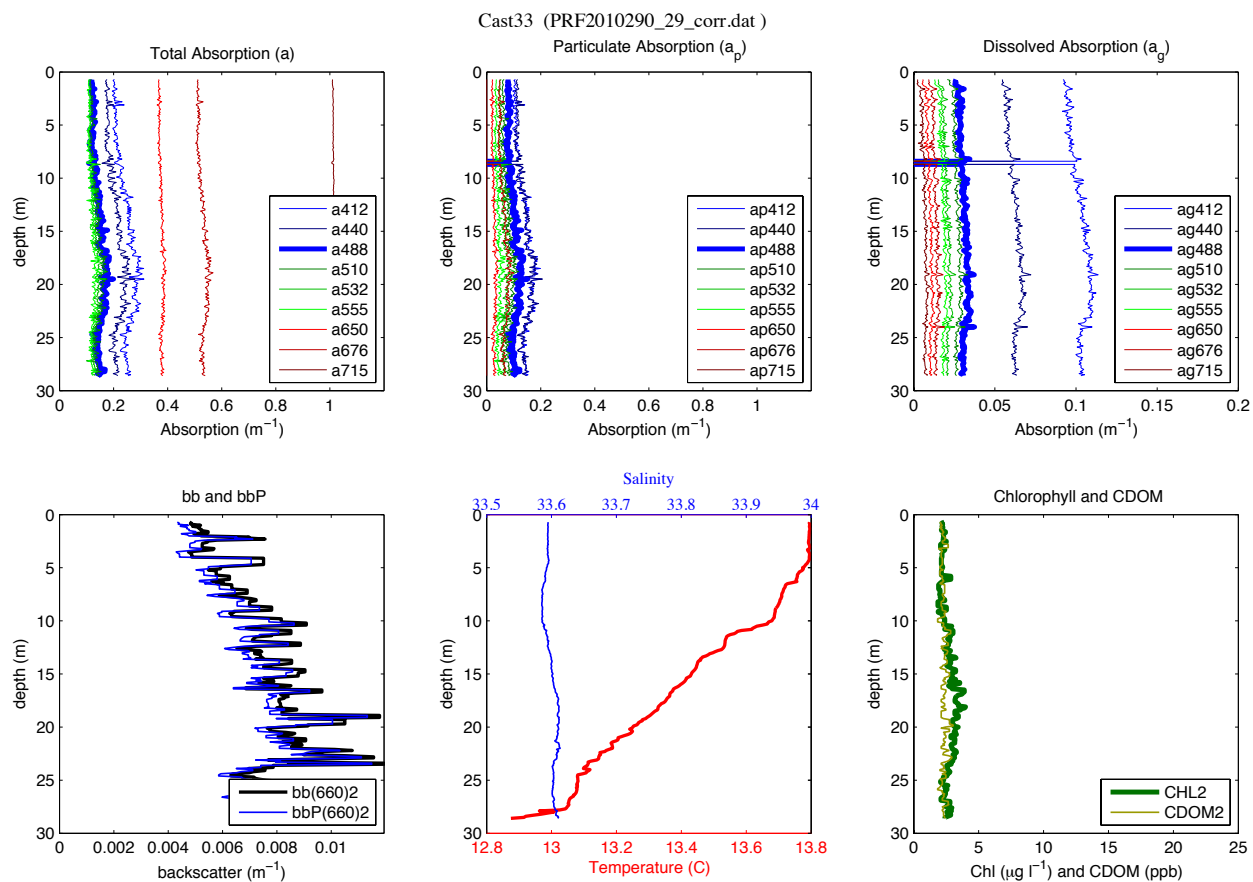


LISST

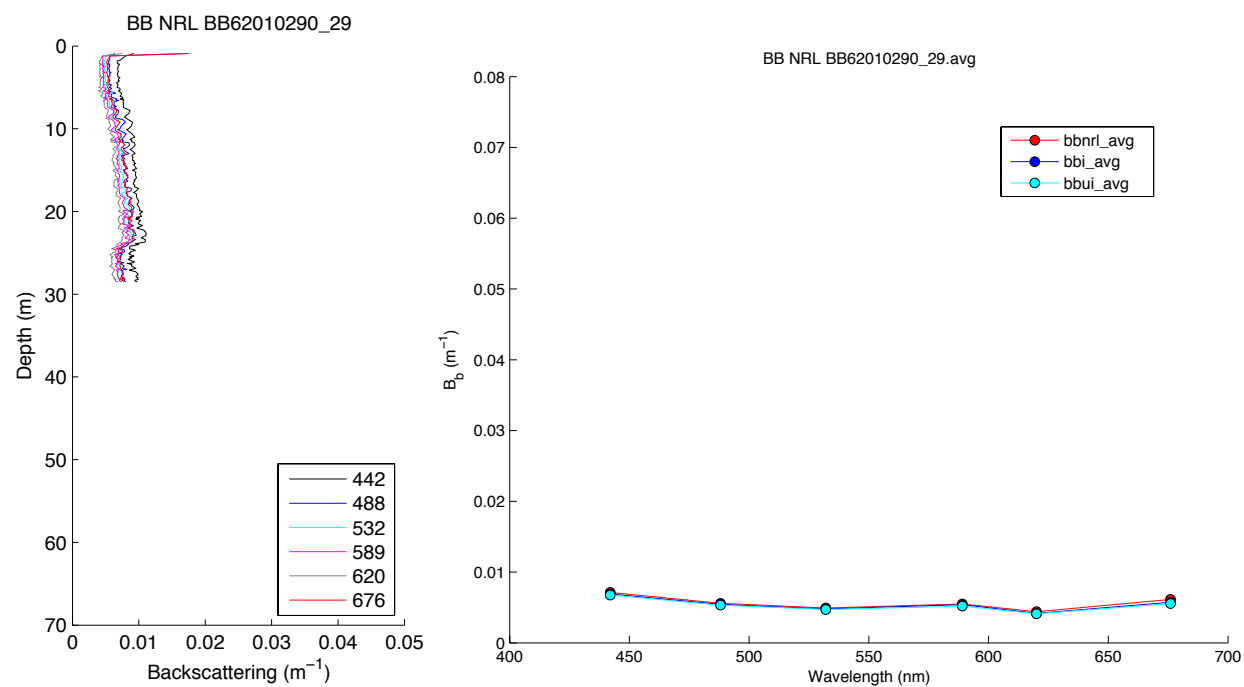
LISST – Cast 33



Optics Profile Package

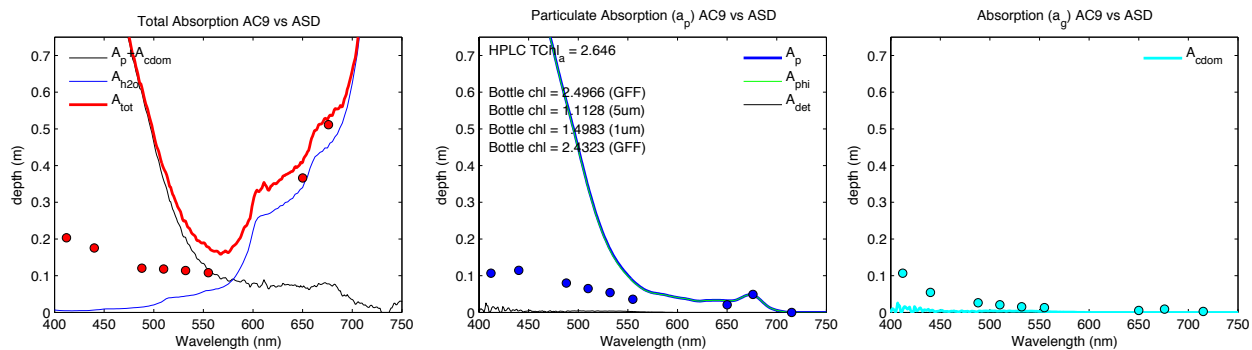


HydroScat

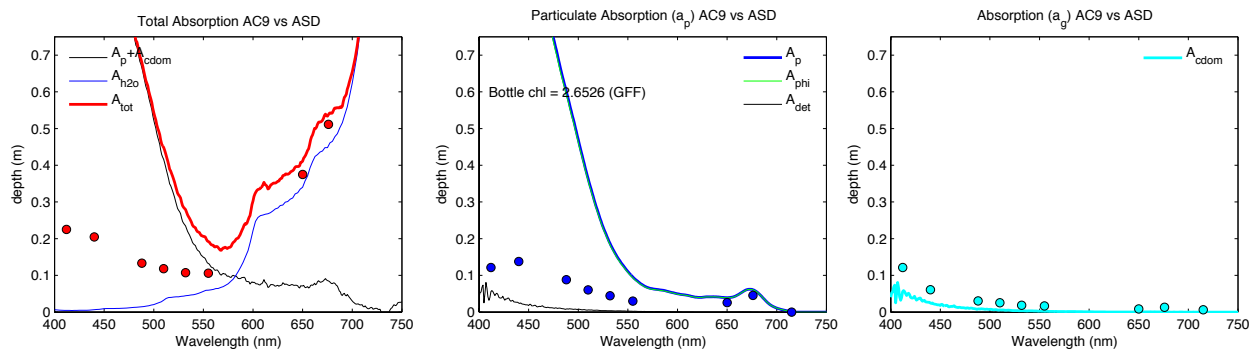


Filter Pad Absorption (w/ AC9)

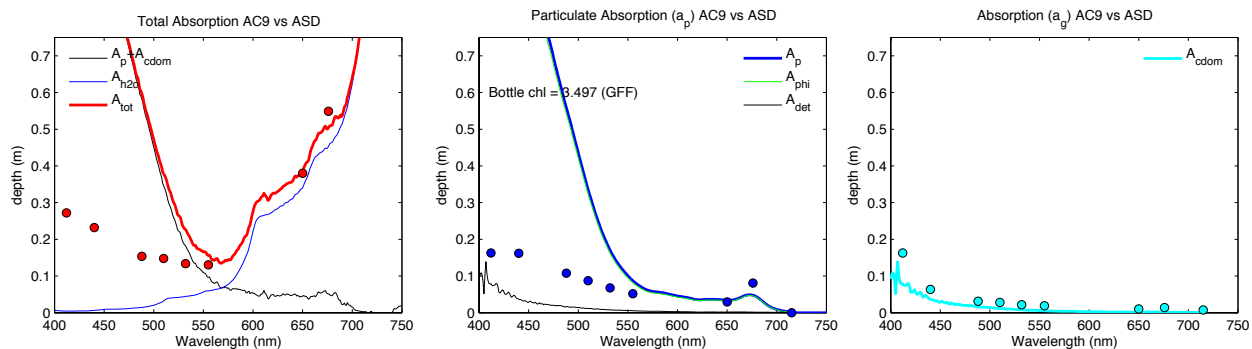
AC9 vs ASD Cast 33 – 0m (PRF2010290_29_corr.dat) CTD 33



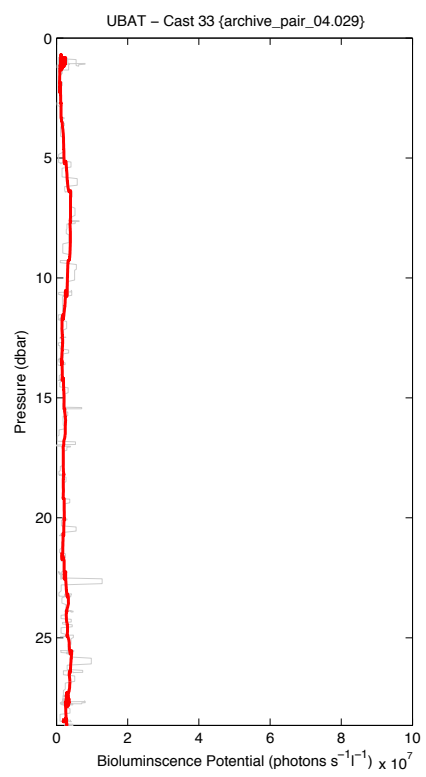
AC9 vs ASD Cast 33 – 10m (PRF2010290_29_corr.dat) CTD 33



AC9 vs ASD Cast 33 – 15m (PRF2010290_29_corr.dat) CTD 33



UBAT

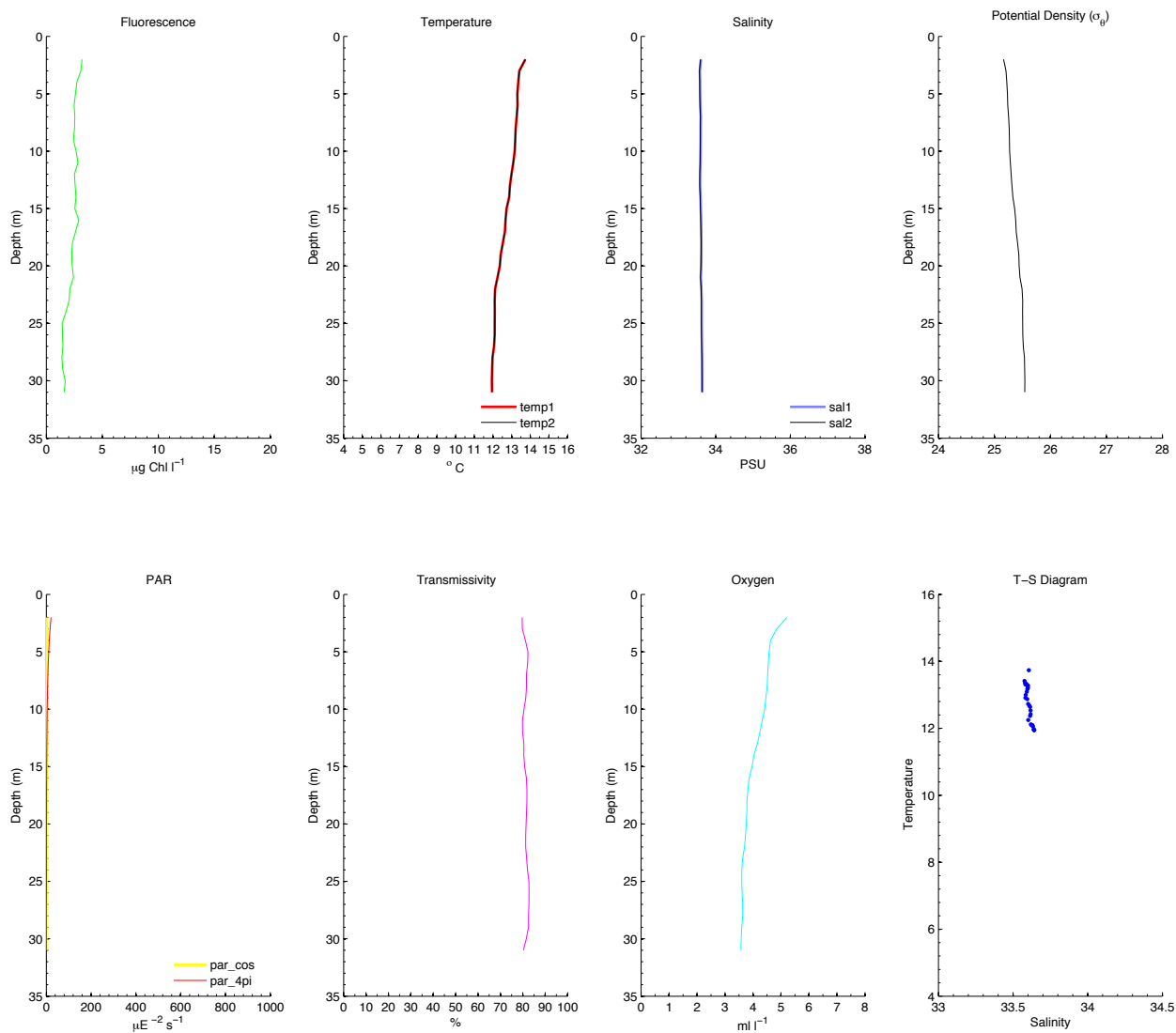


Cast 34 (0817 PDT)

(no water samples - missed bloom) (overcast, light rain)

CTD

BIOSPACE 2010 Cast 34 (TimeSeries3; 2010-10-17 15:21:42.000 UTC) CTD Downcast Data (Calibrated)

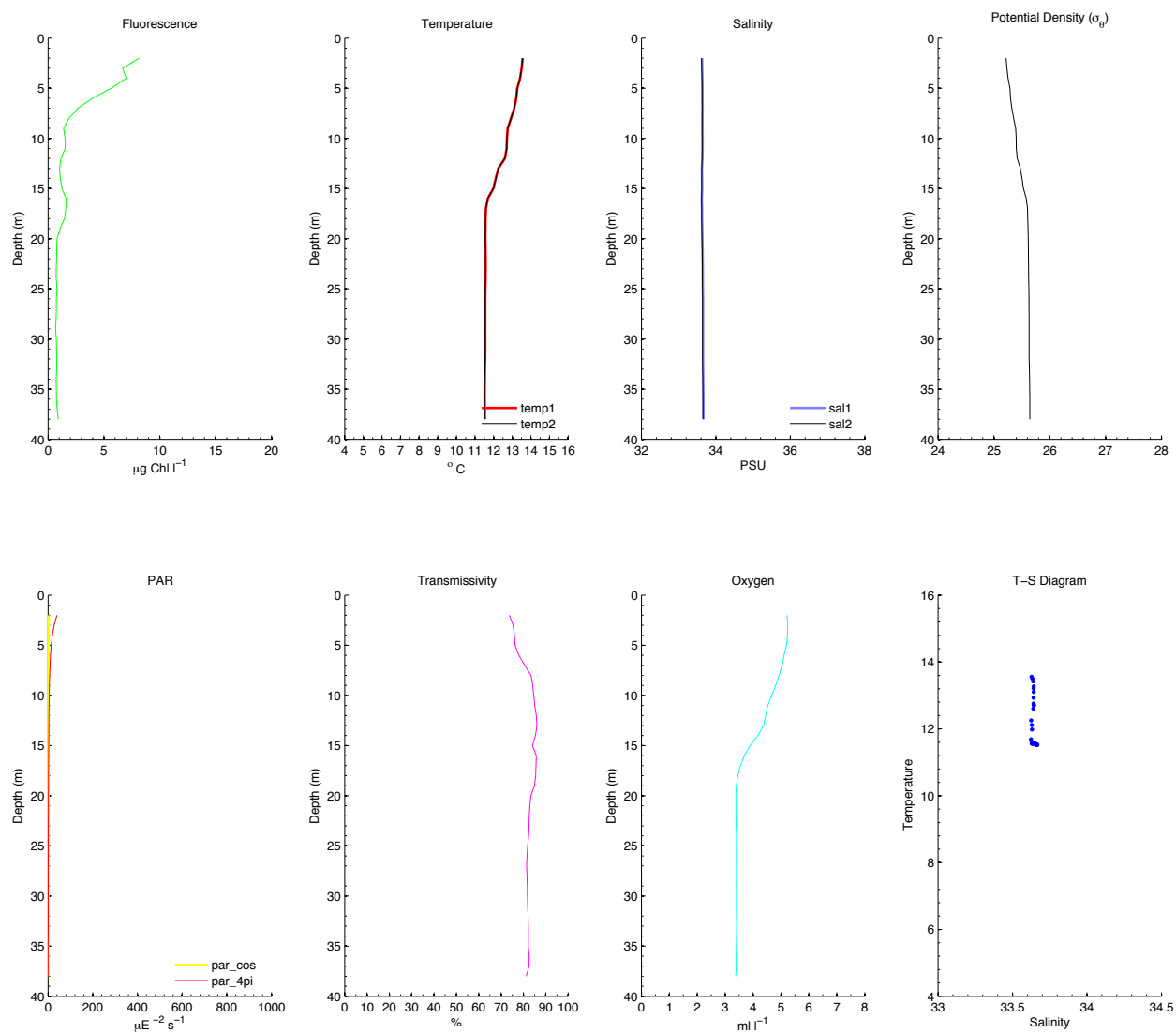


Cast 35 (0838 PDT)

(no water samples - missed bloom) (overcast)

CTD

BIOSPACE 2010 Cast 35 (TimeSeries4; 2010-10-17 15:40:19.000 UTC) CTD Downcast Data (Calibrated)

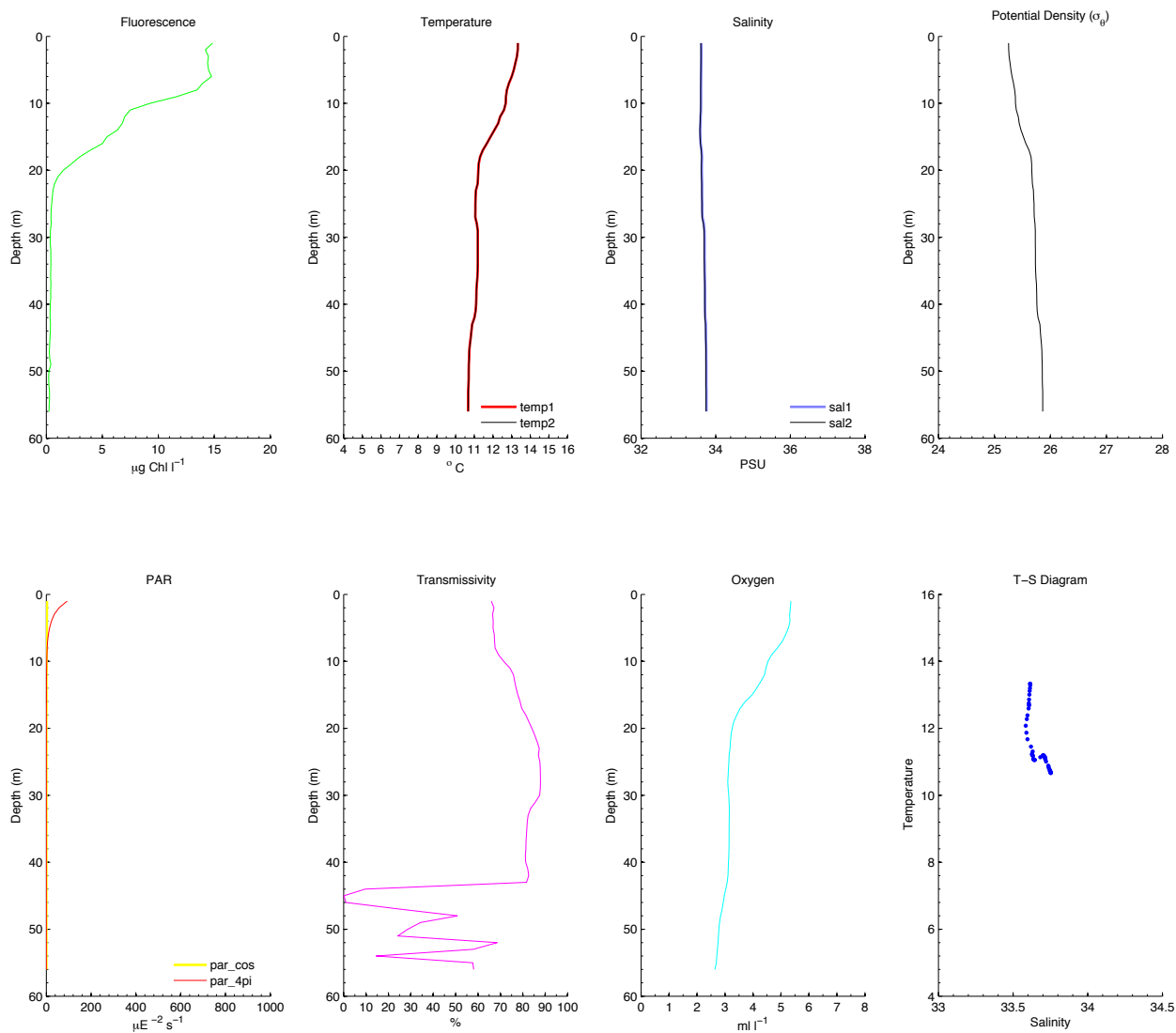


Cast 36 (0905 PDT)

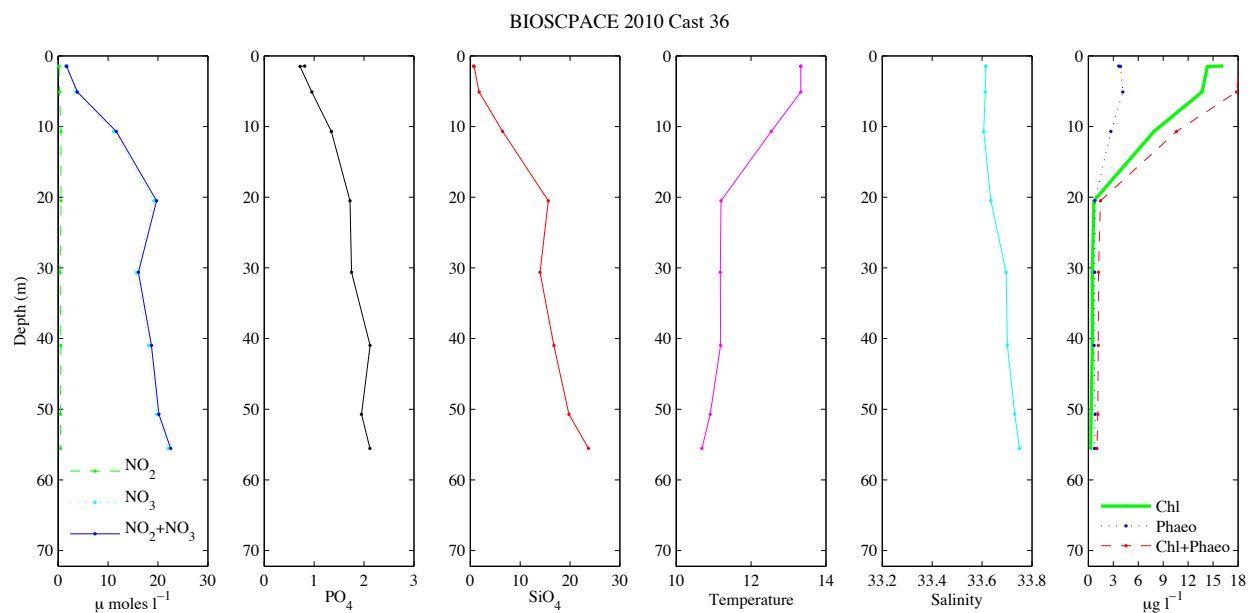
(surface net tow-microscope diatom chains- 1 *prorocentrum*) (diatom bloom) (overcast)

CTD

BIOSPACE 2010 Cast 36 (TimeSeries5; 2010-10-17 16:07:00.000 UTC) CTD Downcast Data (Calibrated)

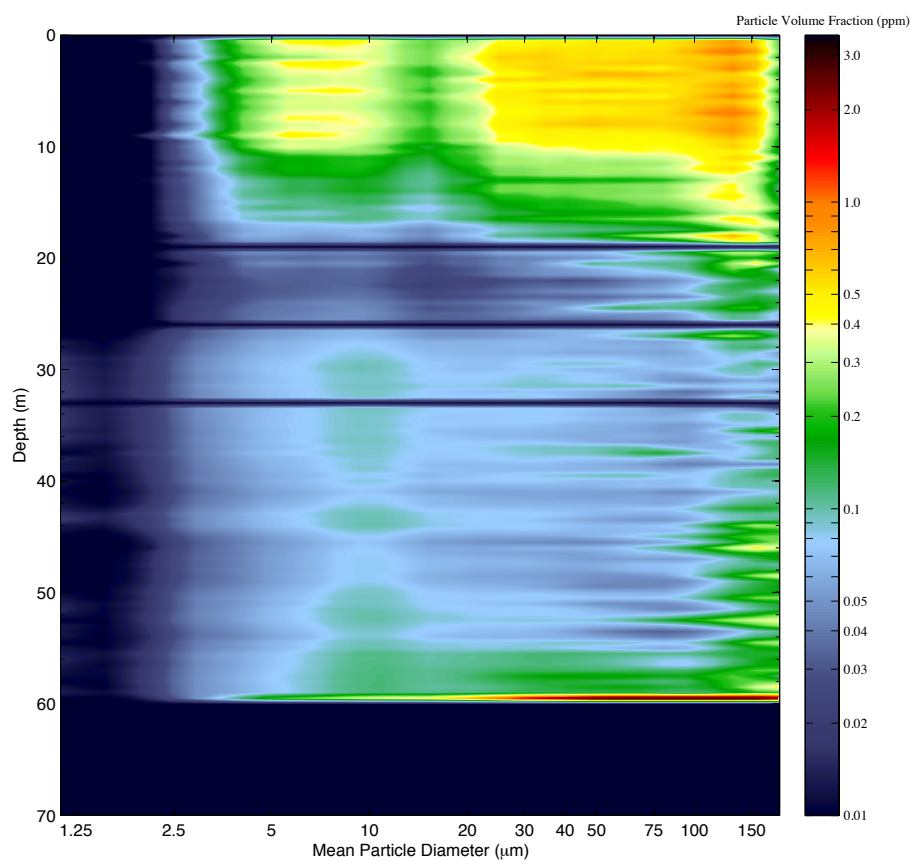


Bottle Nutrients and Chlorophyll

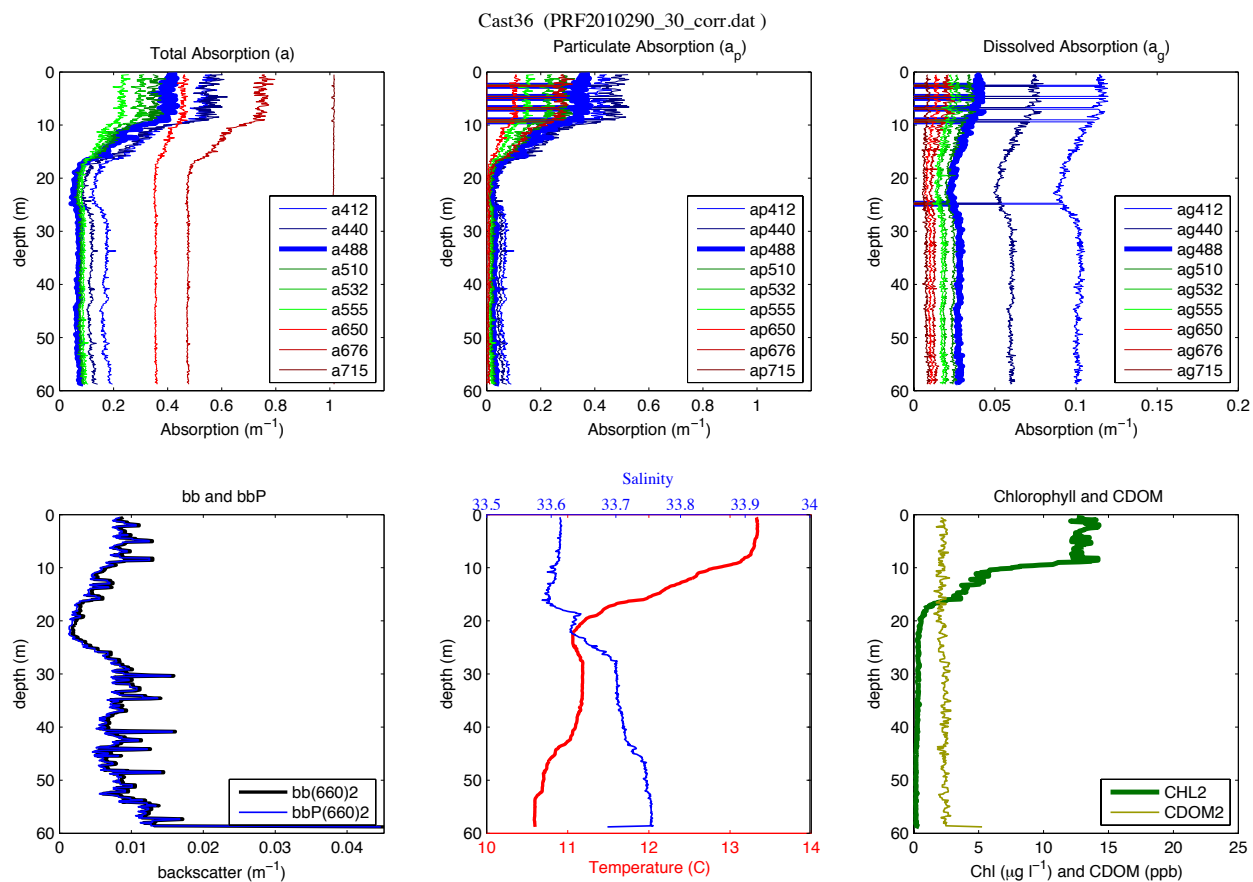


LISST

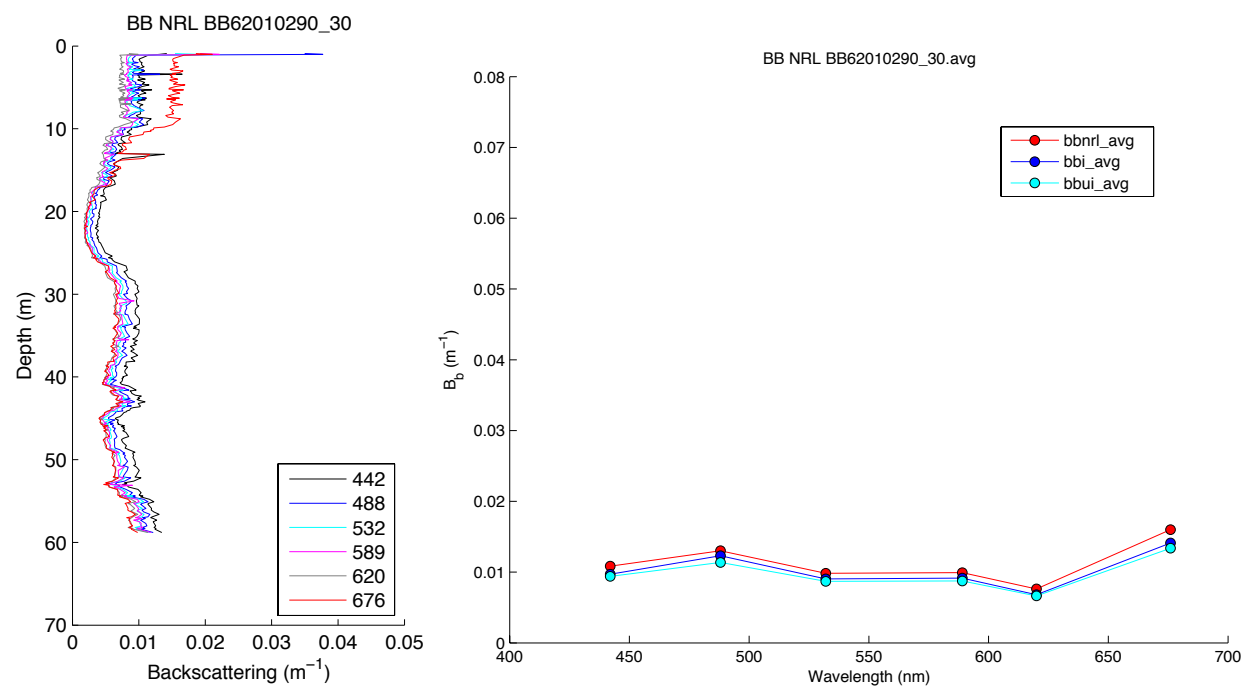
LISST – Cast 36



Optics Profile Package

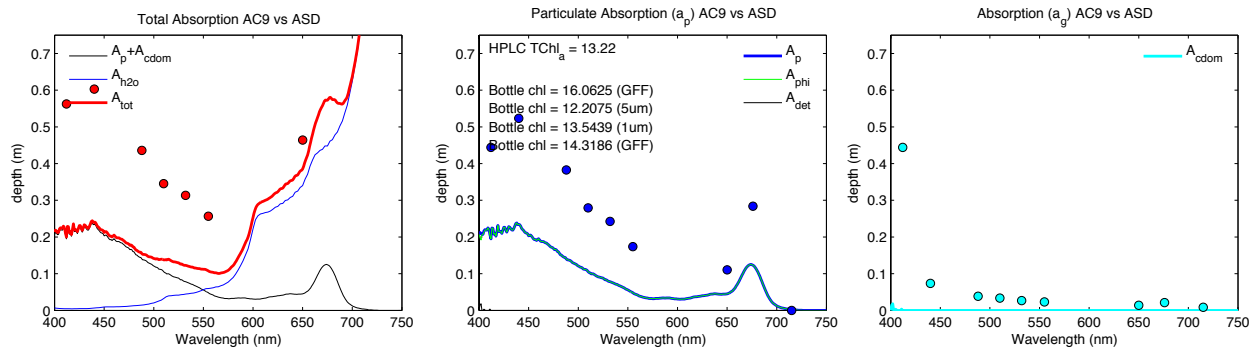


HydroScat

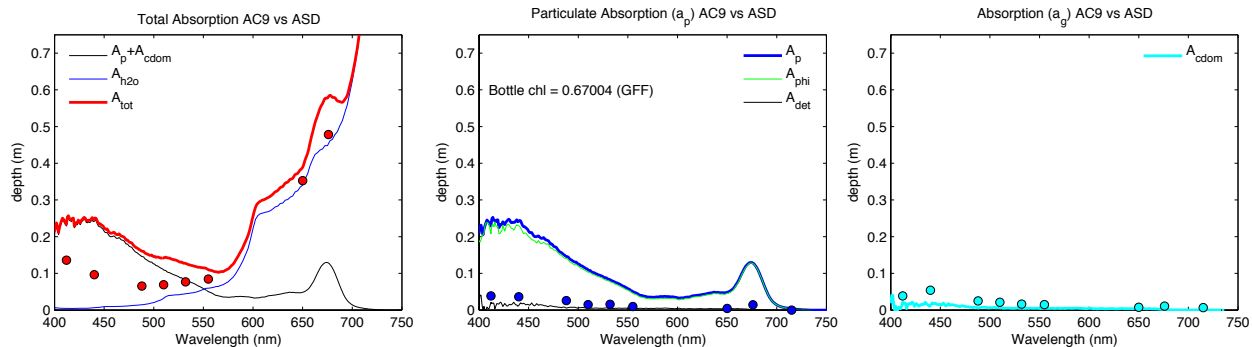


Filter Pad Absorption (w/ AC9)

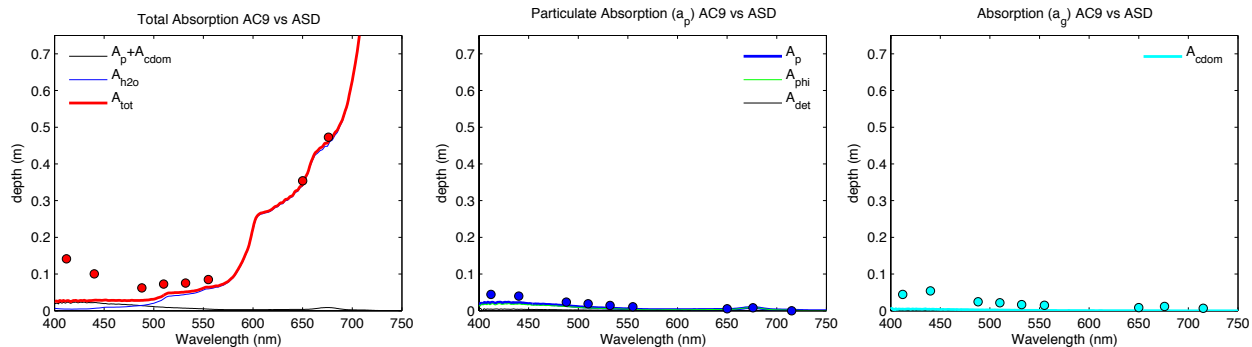
AC9 vs ASD Cast 36 – 0m (PRF2010290_30_corr.dat) CTD 02



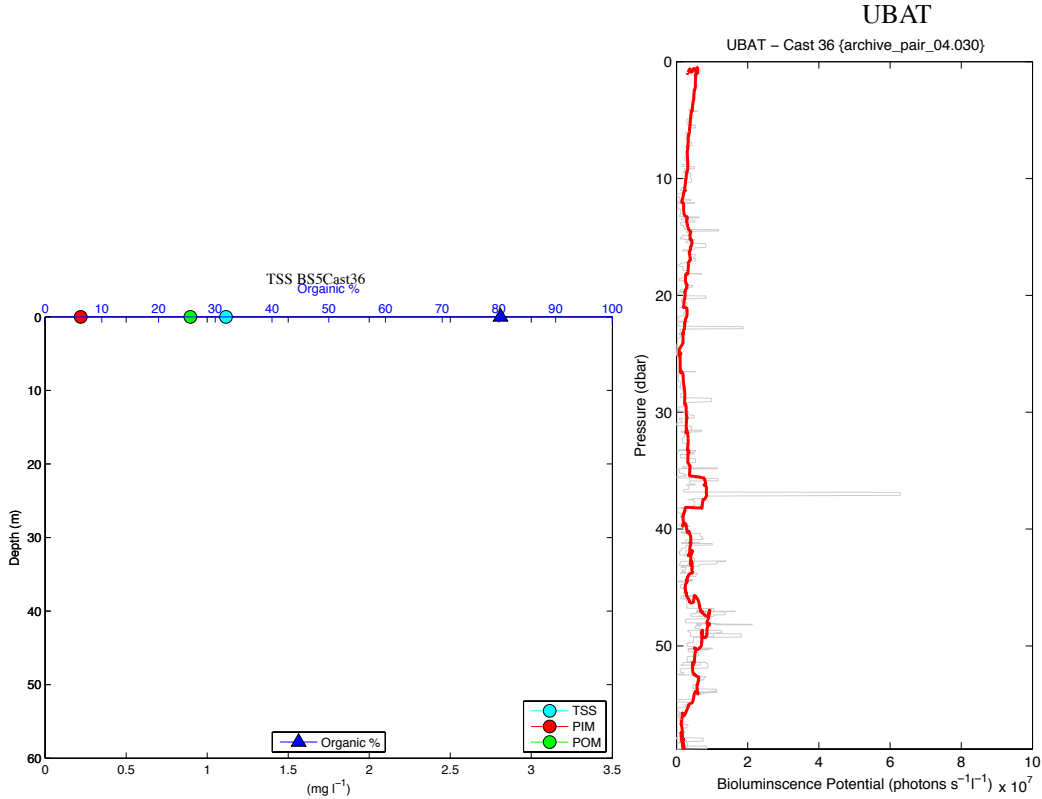
AC9 vs ASD Cast 36 – 20m (PRF2010290_30_corr.dat) CTD 02



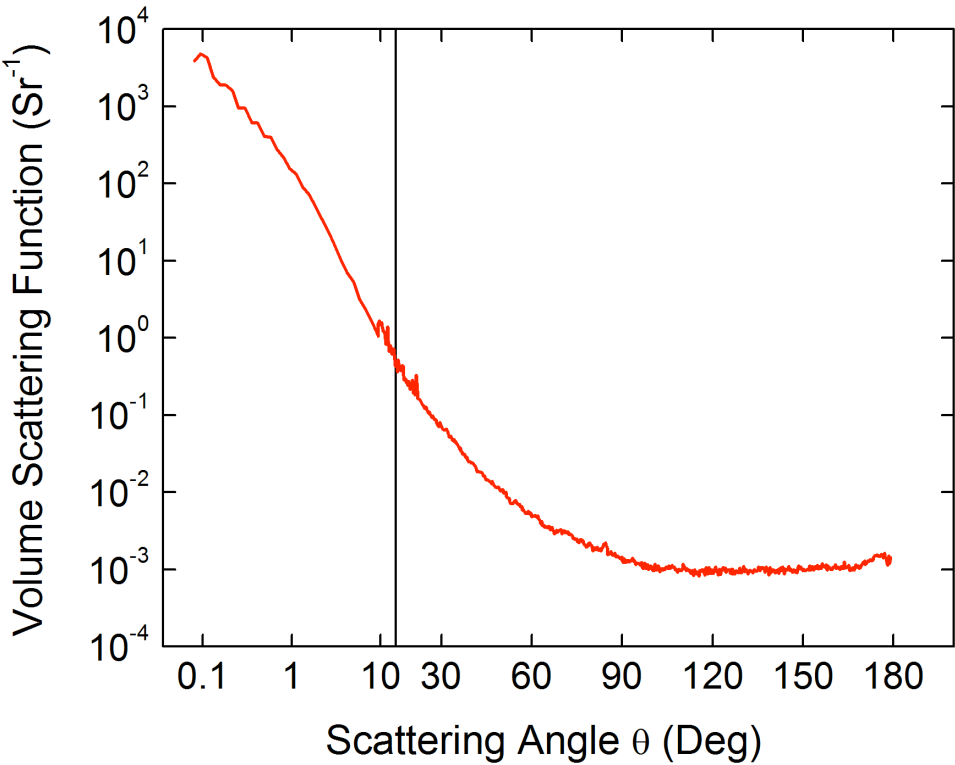
AC9 vs ASD Cast 36 – 25m (PRF2010290_30_corr.dat) CTD 02



TSS



MVSM

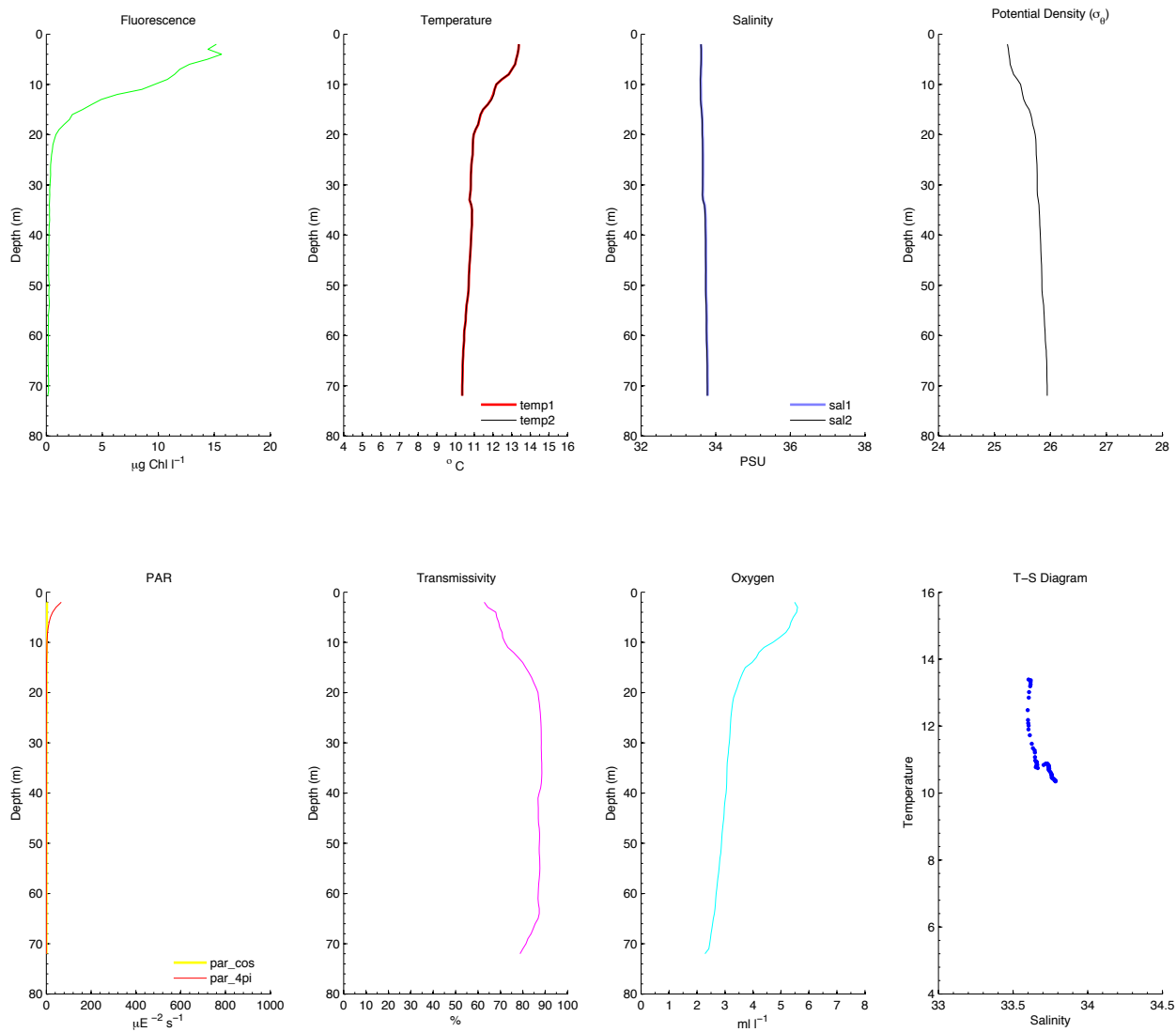


Cast 37 (0959 PDT)

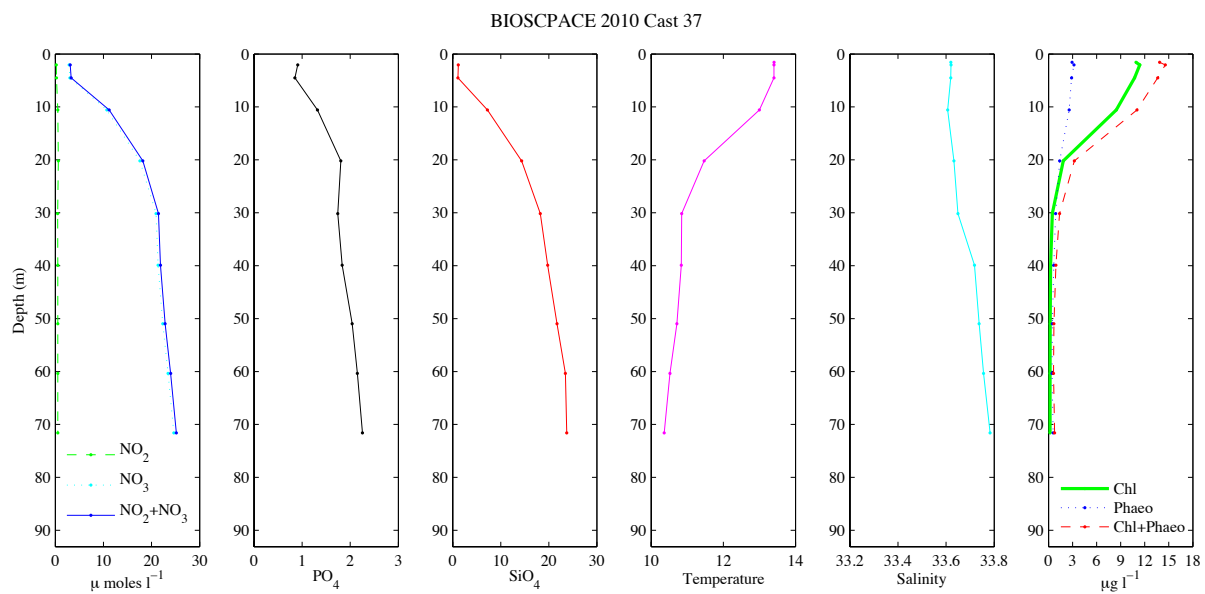
(plankton net tow-mixed diatom chains, *pseudo-nitzschia*, *prorocentrum*, mixed dinos) (mixed diatoms and dinoflagellates) (overcast)

CTD

BIOSPACE 2010 Cast 37 (TimeSeries6; 2010-10-17 17:00:00.000 UTC) CTD Downcast Data (Calibrated)

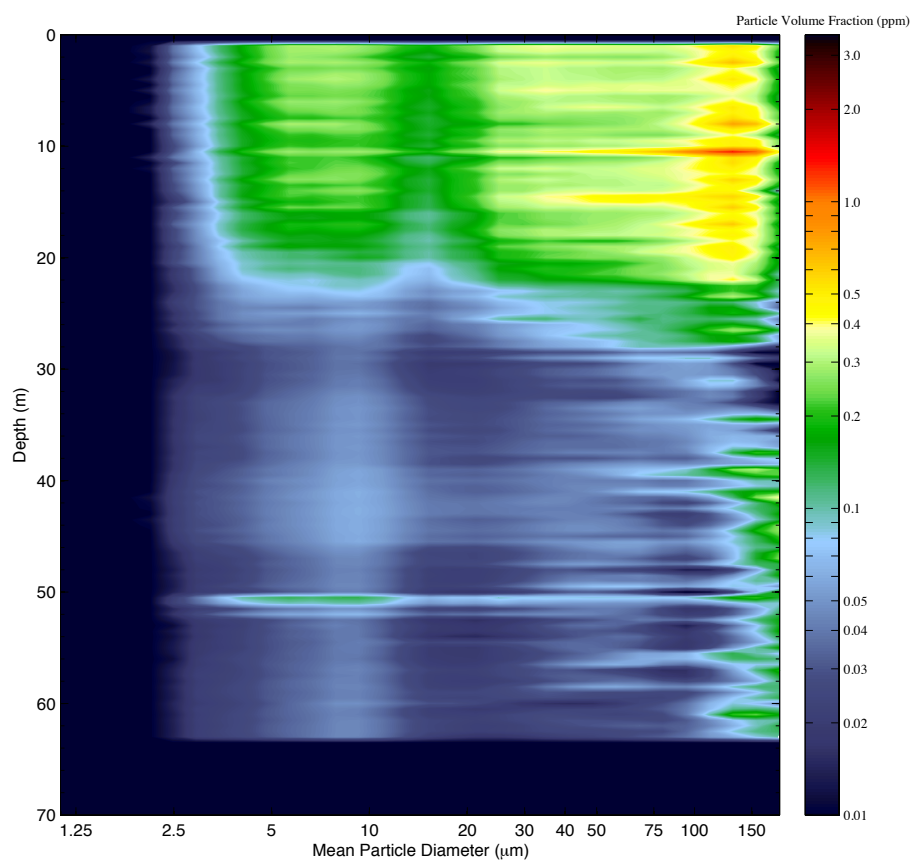


Bottle Nutrients and Chlorophyll

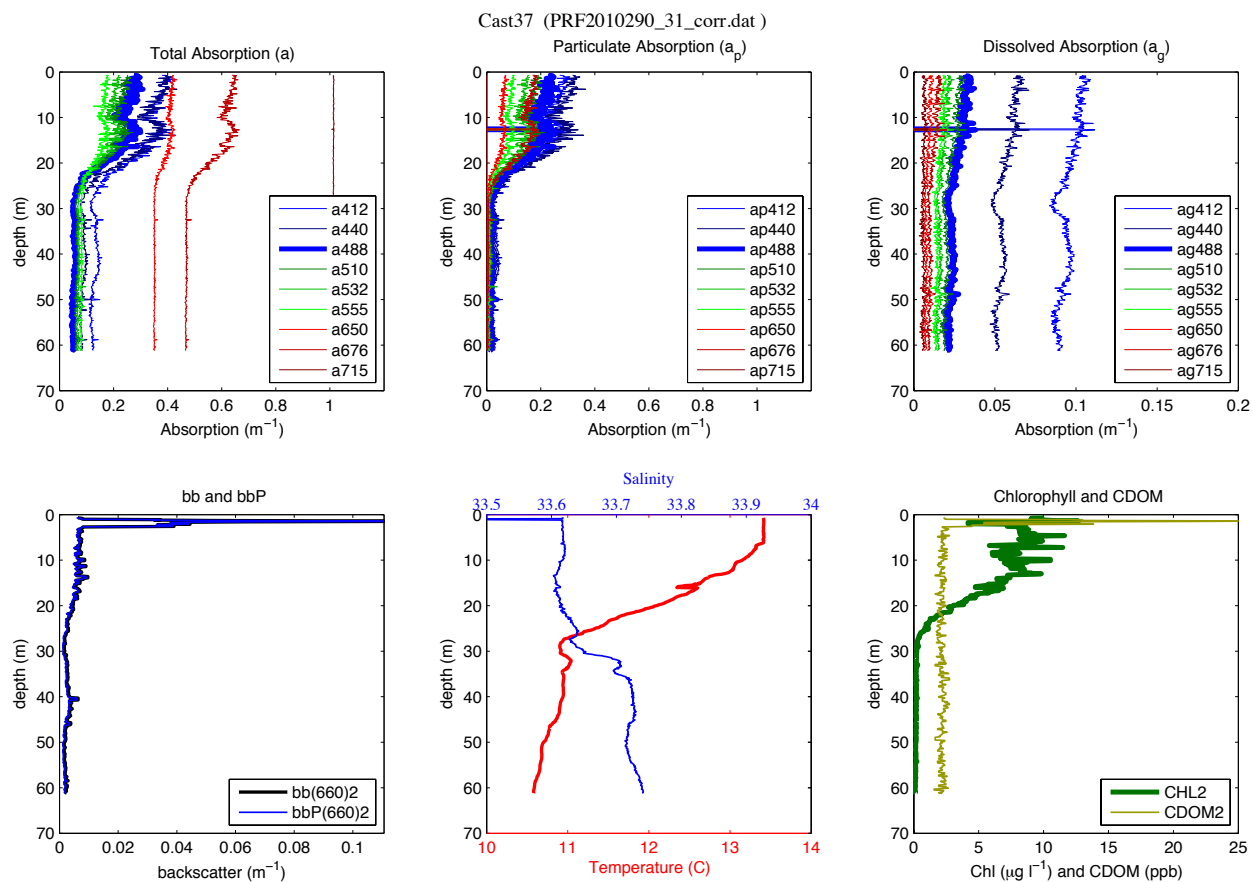


LISST

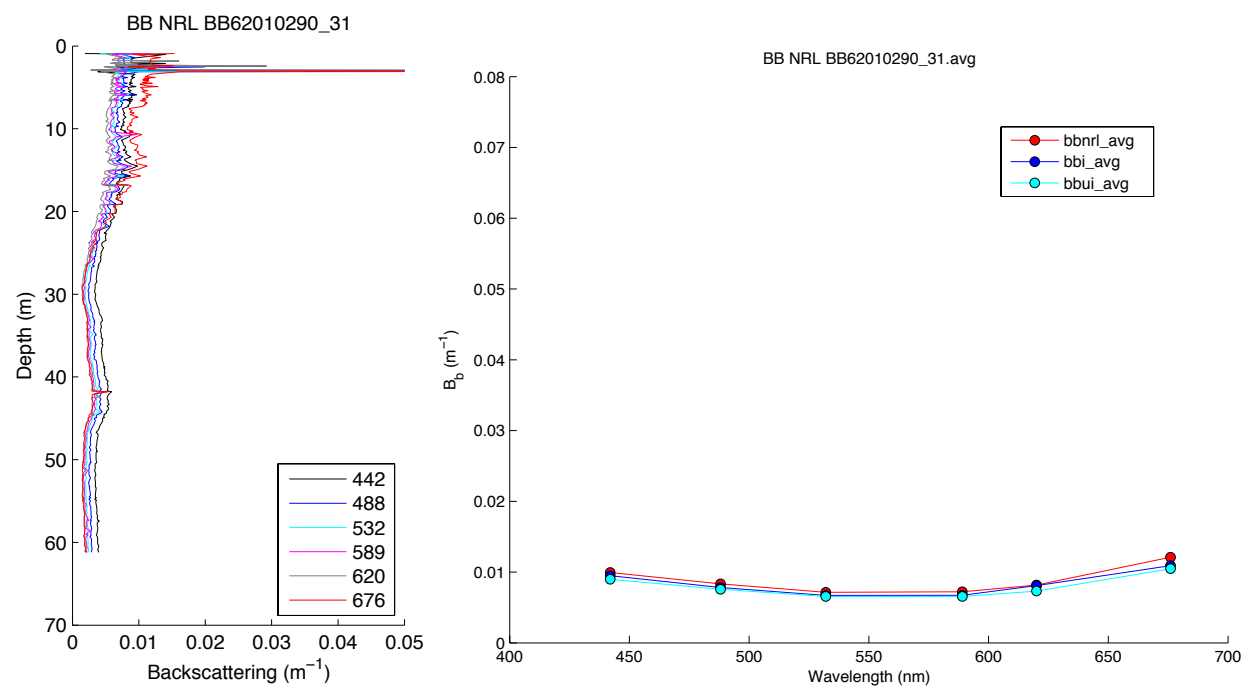
LISST – Cast 37



Optics Profile Package

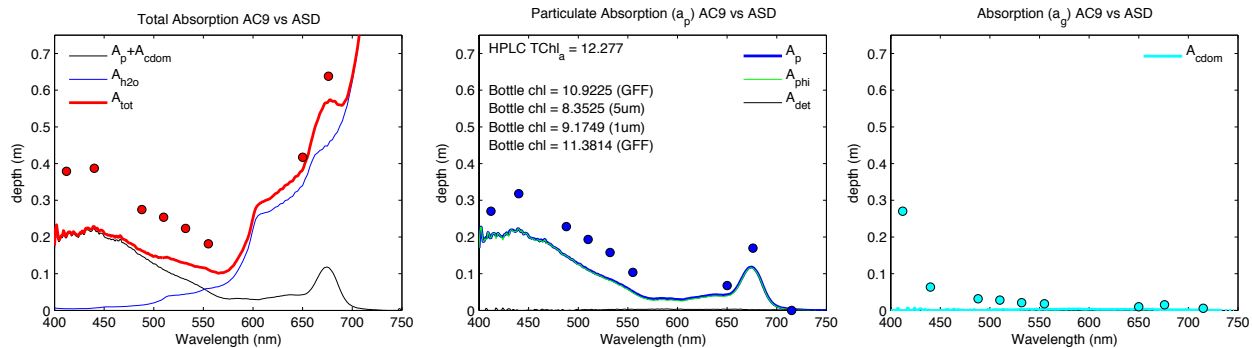


HydroScat

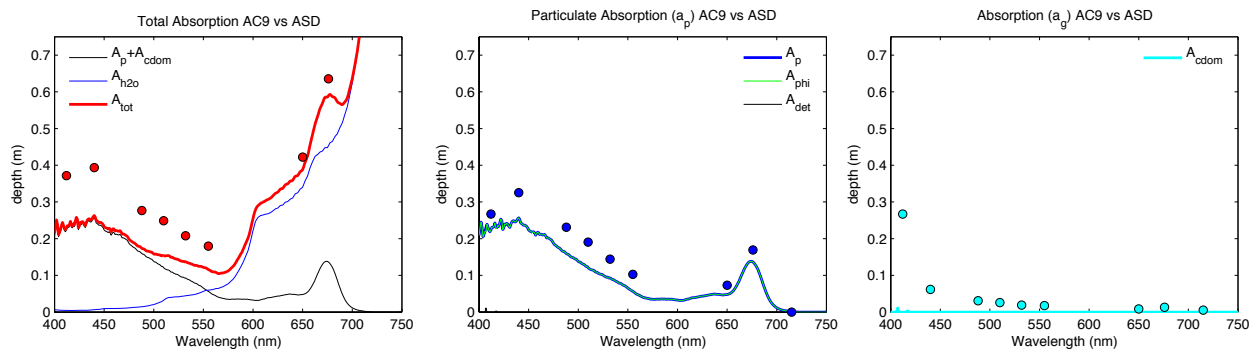


Filter Pad Absorption (w/ AC9)

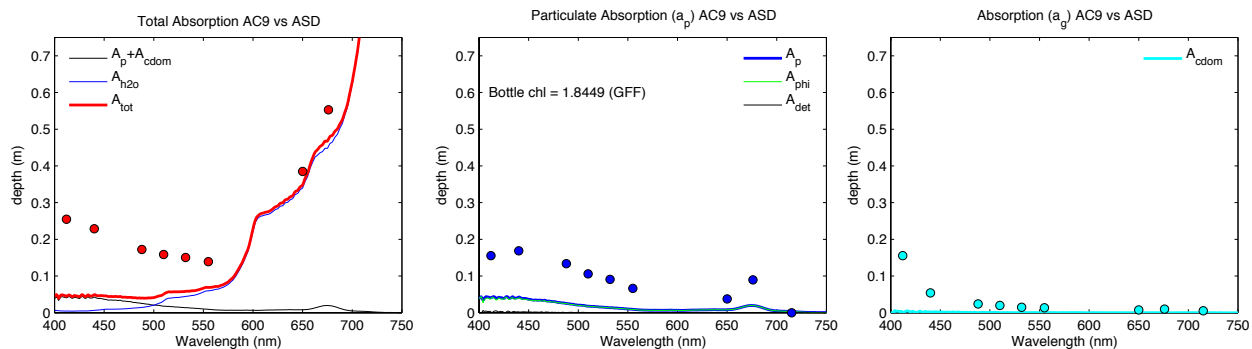
AC9 vs ASD Cast 37 – 0m (PRF2010290_31_corr.dat) Timeseries 2



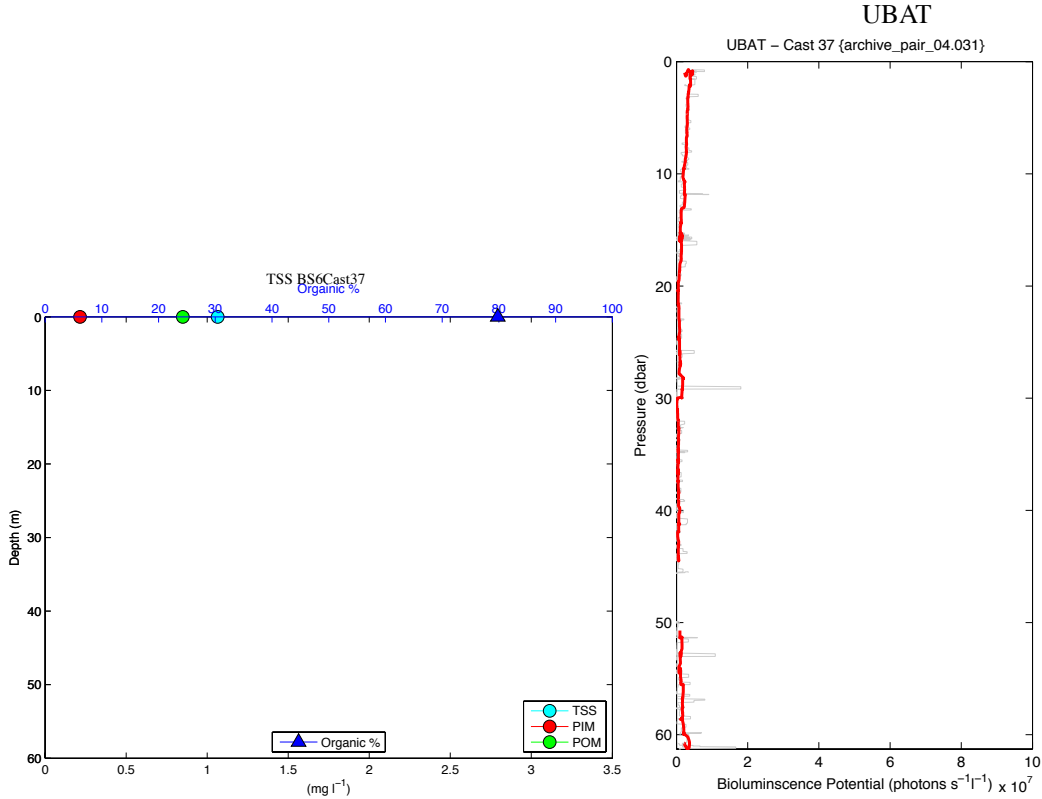
AC9 vs ASD Cast 37 – 5m (PRF2010290_31_corr.dat) Timeseries 2



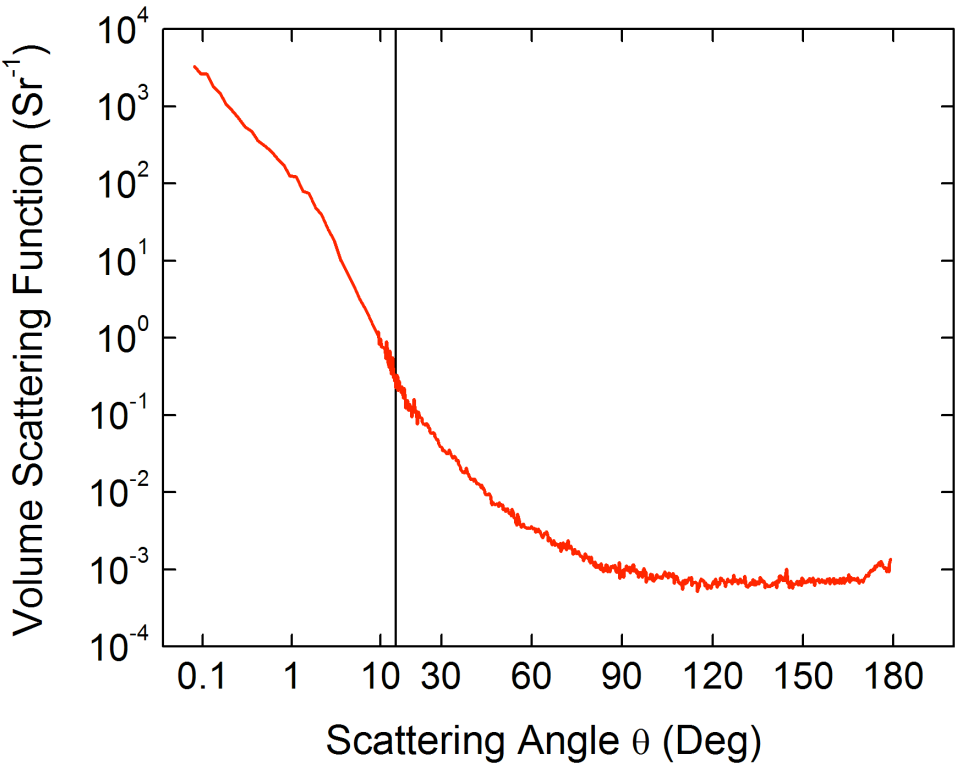
AC9 vs ASD Cast 37 – 20m (PRF2010290_31_corr.dat) Timeseries 2



TSS



MVSM

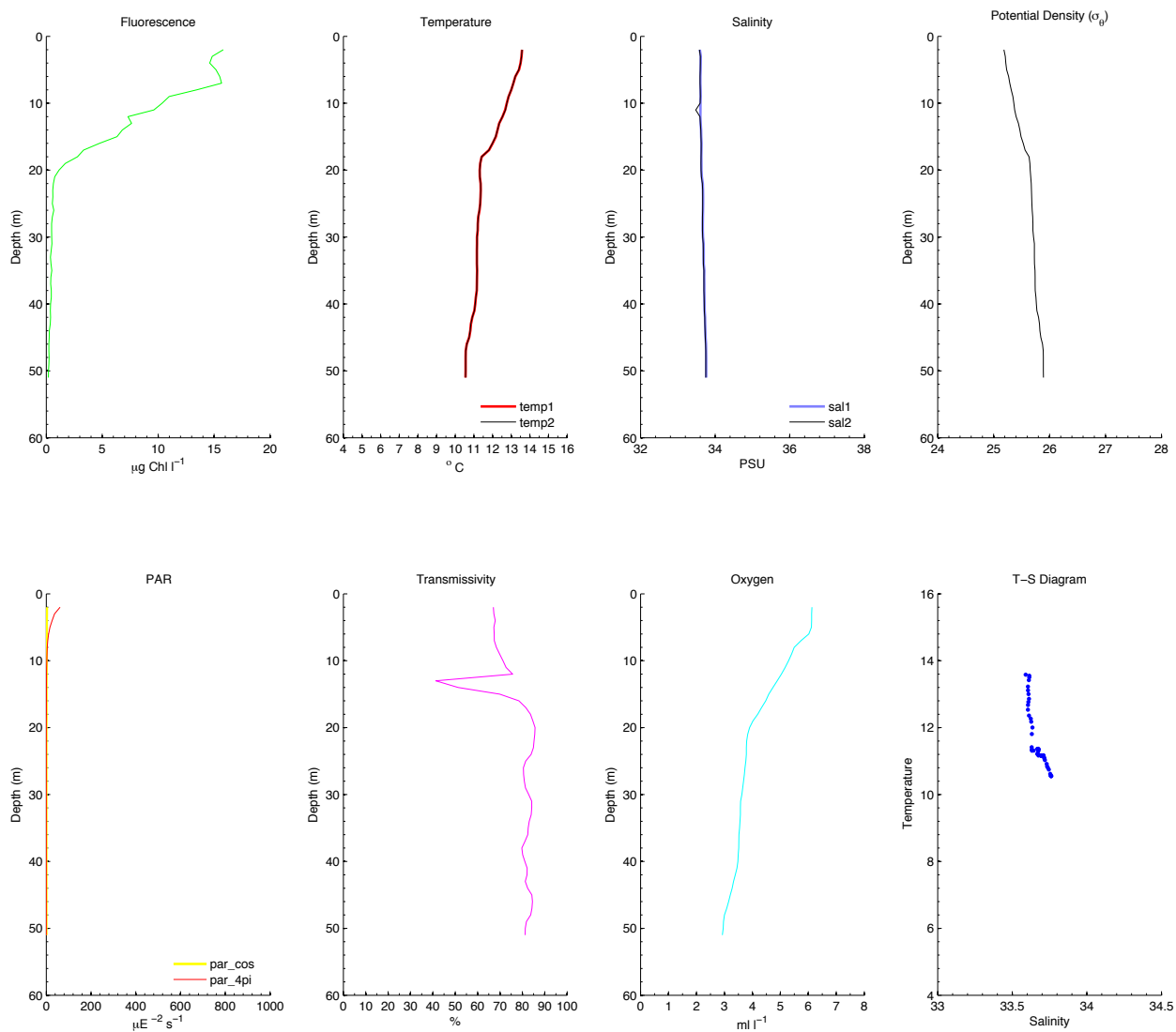


Cast 38 (1206 PDT)

(plankton net tow-same as previous [station](#)) (mixed diatoms and dinoflagellates) (rain)

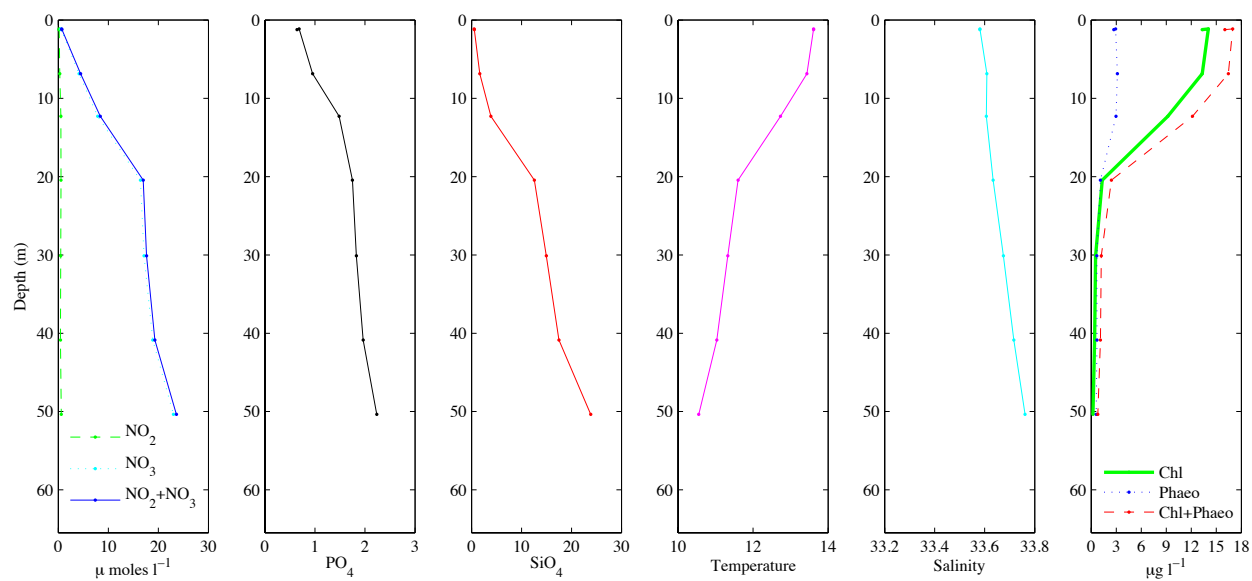
CTD

BIOSPACE 2010 Cast 38 (TimeSeries7; 2010-10-17 19:00:00.000 UTC) CTD Downcast Data (Calibrated)



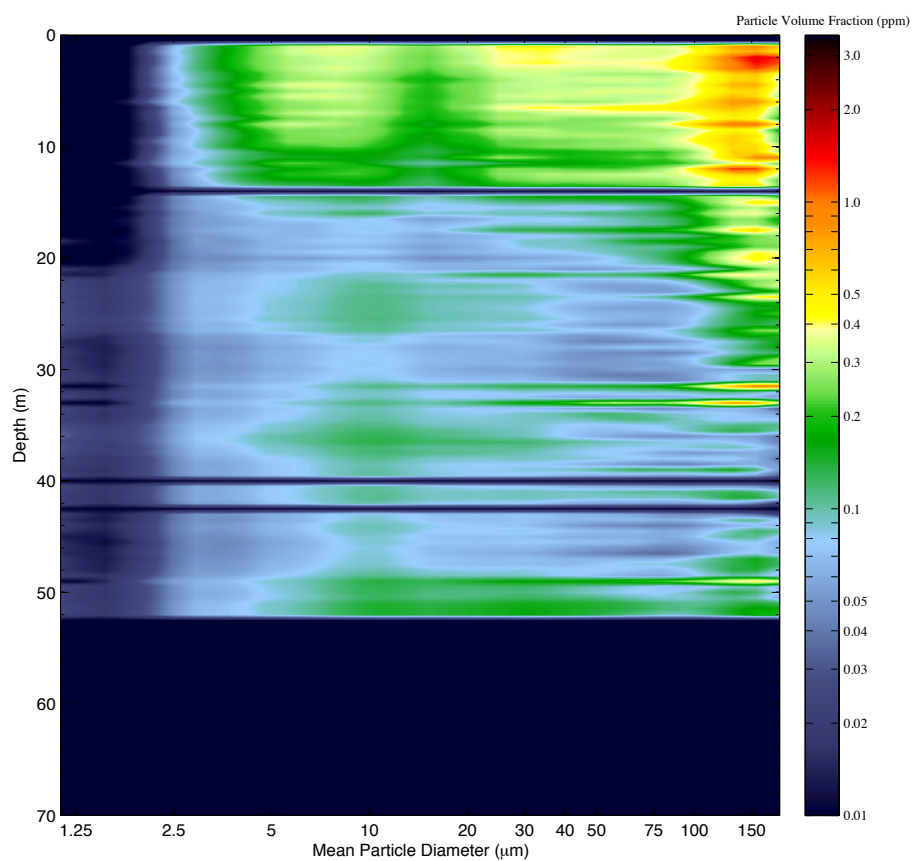
Bottle Nutrients and Chlorophyll

BIOSPACE 2010 Cast 38

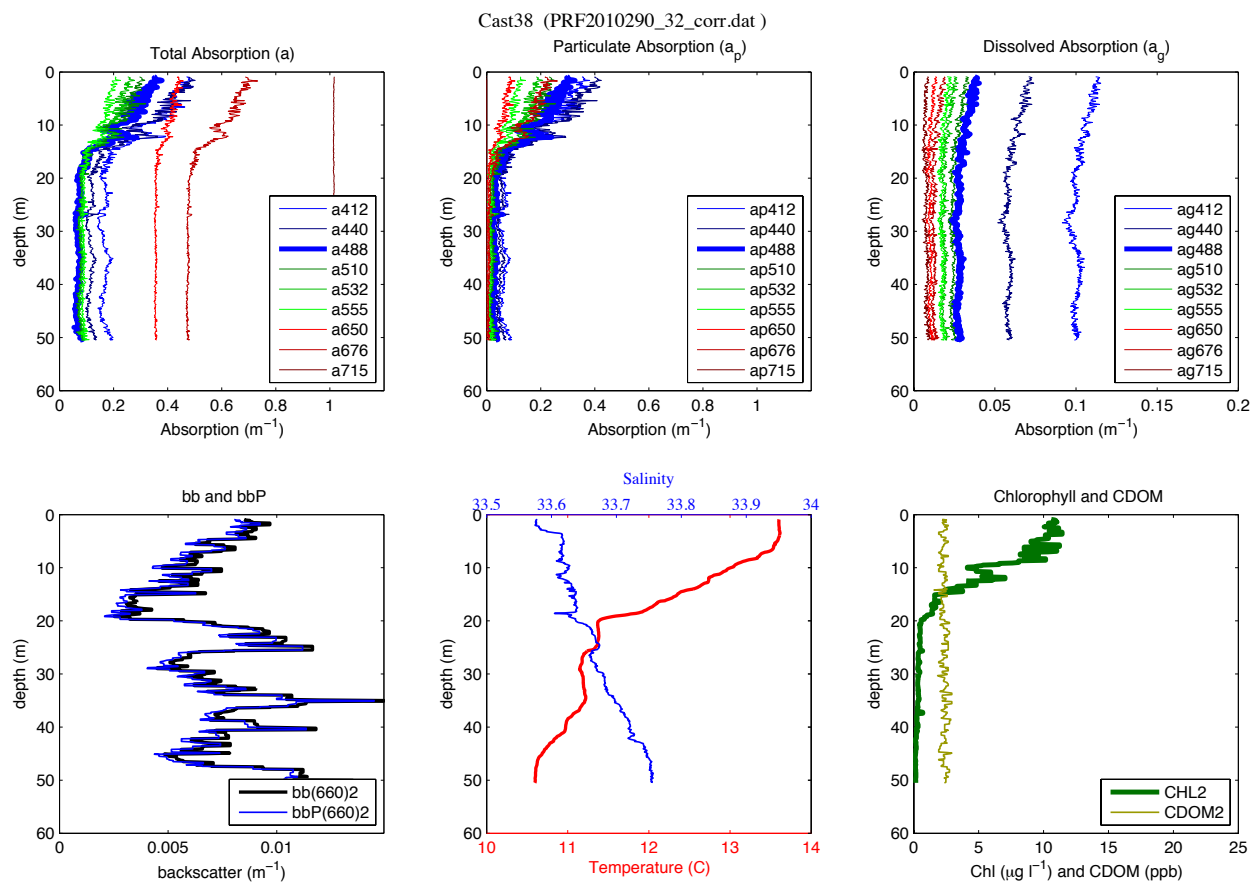


LISST

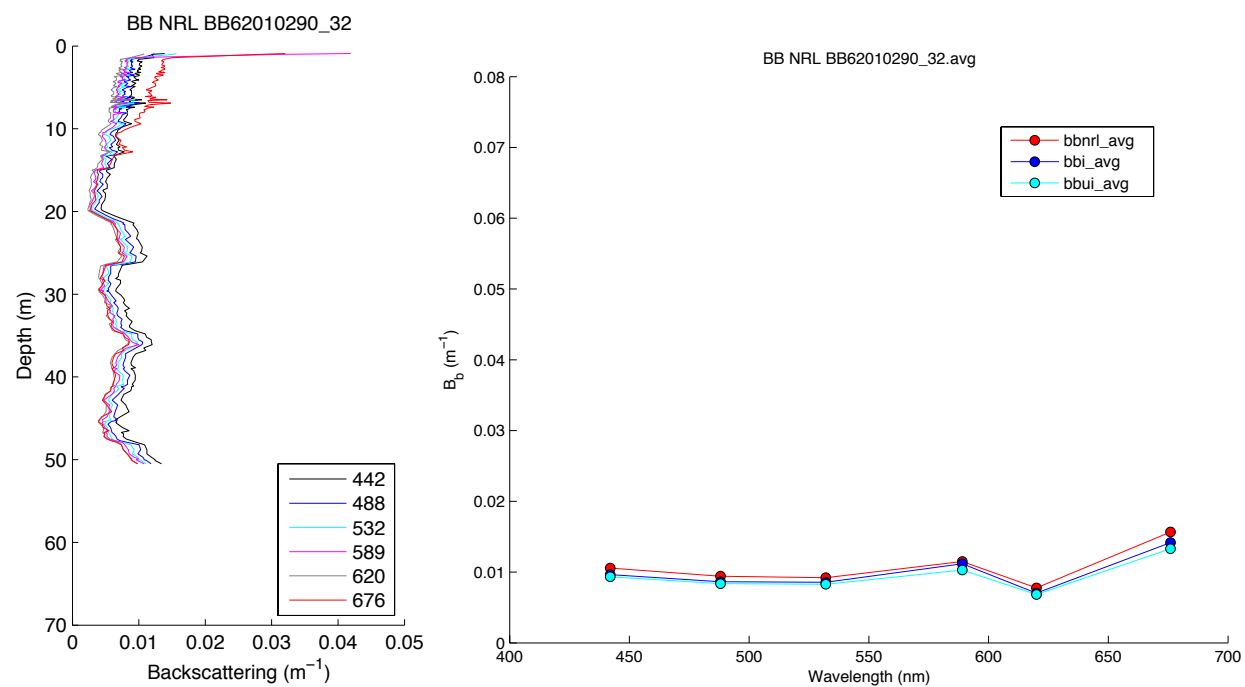
LISST – Cast 38



Optics Profile Package

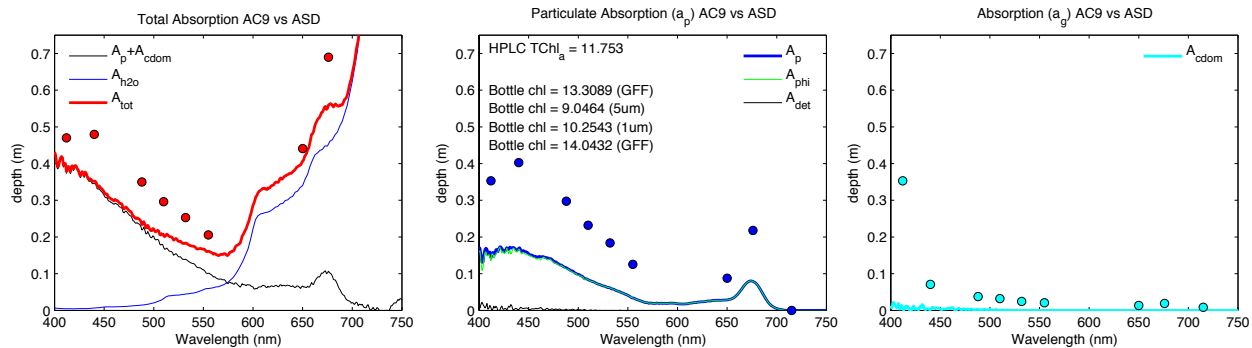


HydroScat

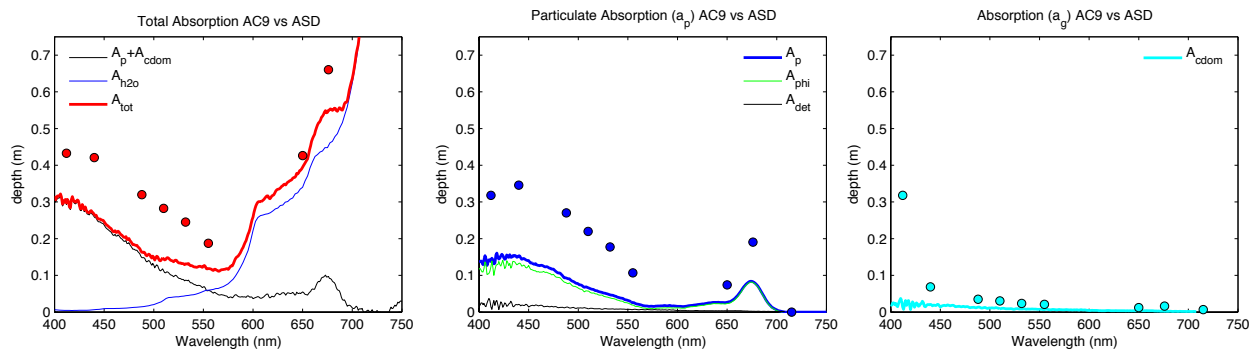


Filter Pad Absorption (w/ AC9)

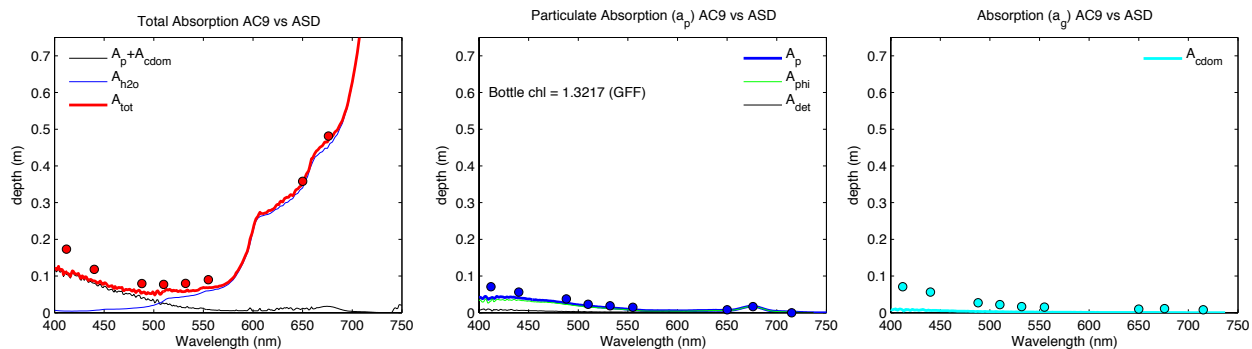
AC9 vs ASD Cast 38 – 0m (PRF2010290_32_corr.dat) Timeseries 5



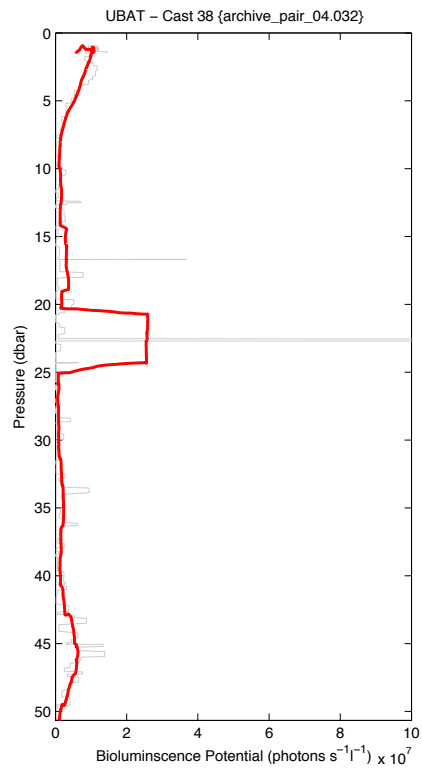
AC9 vs ASD Cast 38 – 4m (PRF2010290_32_corr.dat) Timeseries 5



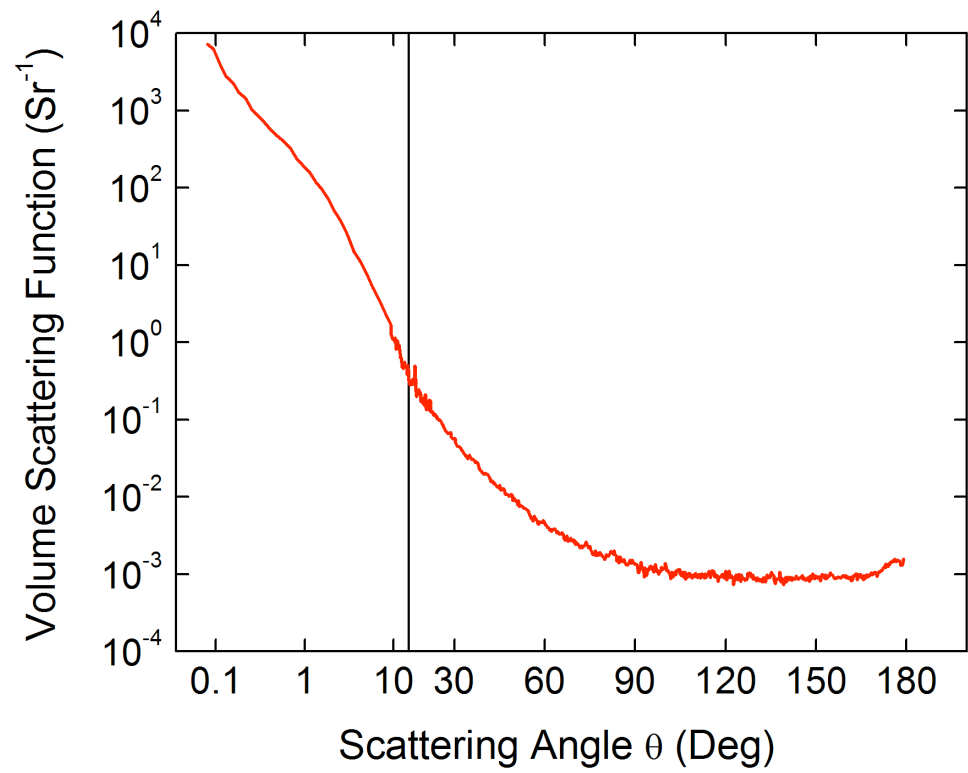
AC9 vs ASD Cast 38 – 20m (PRF2010290_32_corr.dat) Timeseries 5



UBAT



MVSM

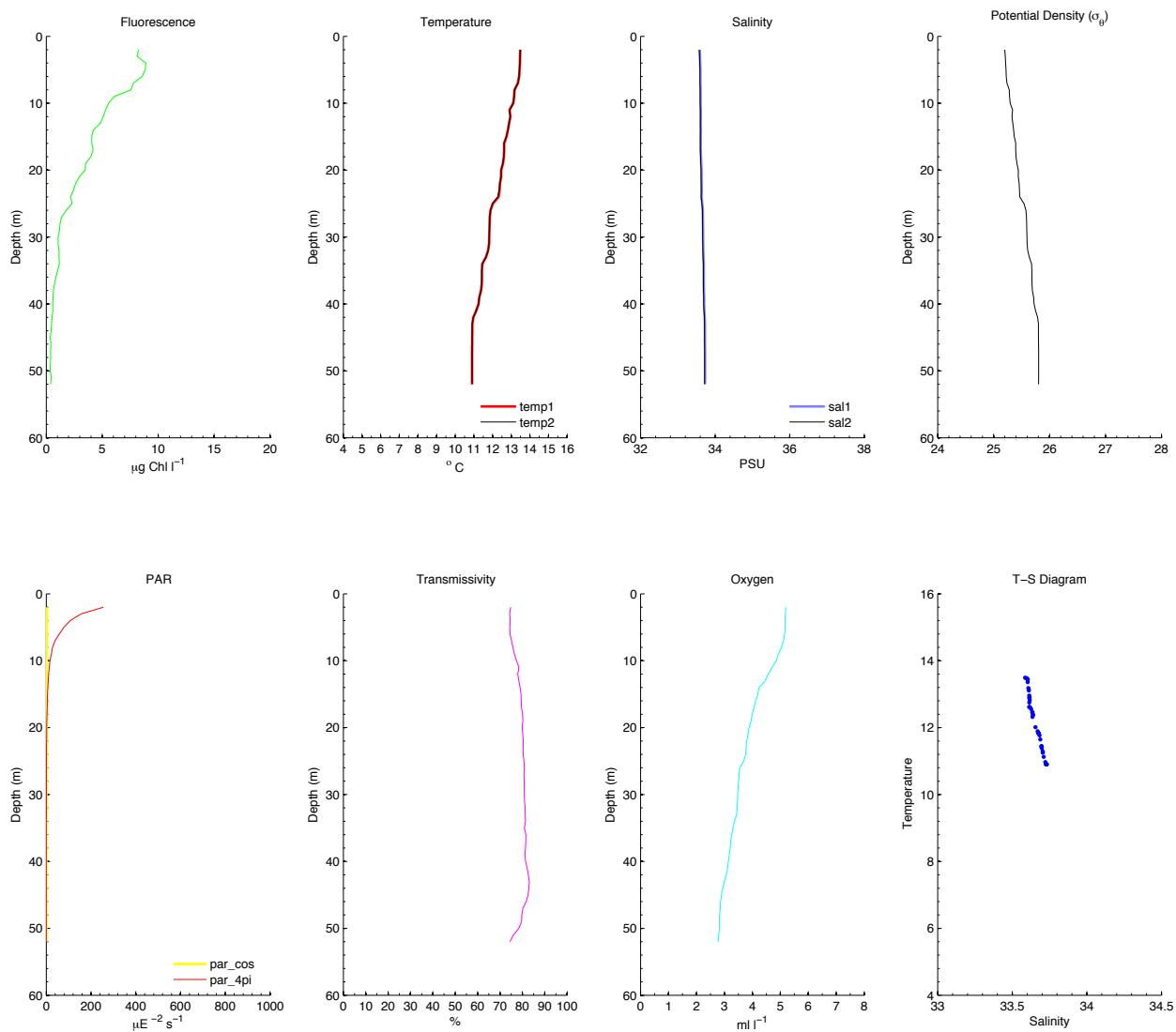


Cast 39 (1330 PDT; [Station BS13](#))

(plankton net still mixed phyto -maybe more *prorocentrum* here) (mostly overcast, some patches of blue)

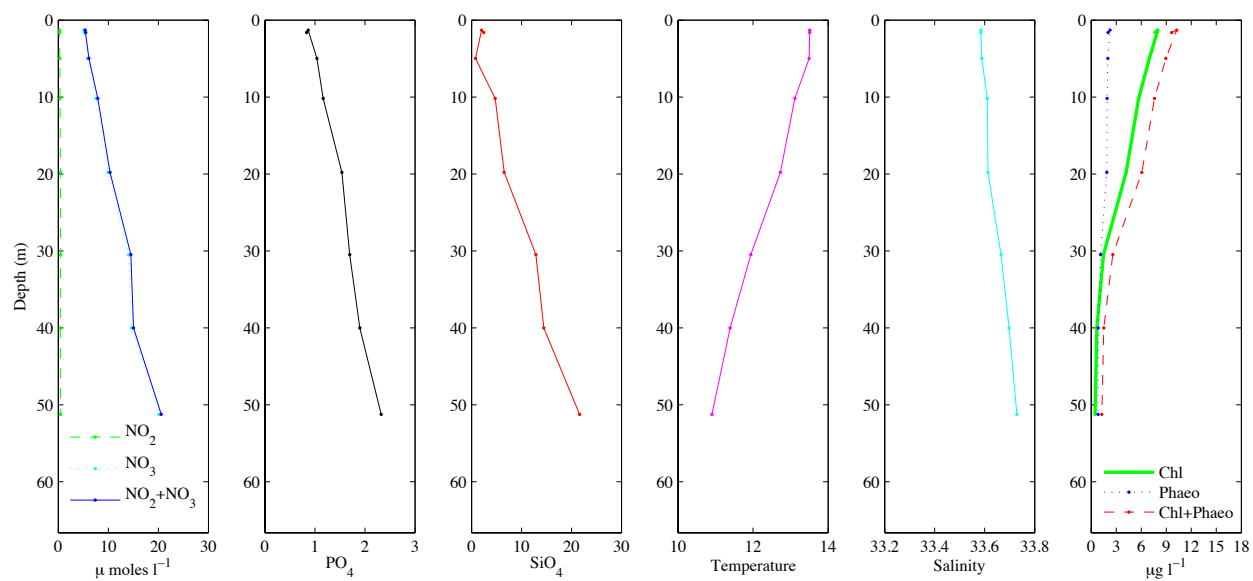
CTD

BIOSPACE 2010 Cast 39 (CTD13; 2010-10-17 20:32:00.000 UTC) CTD Downcast Data (Calibrated)



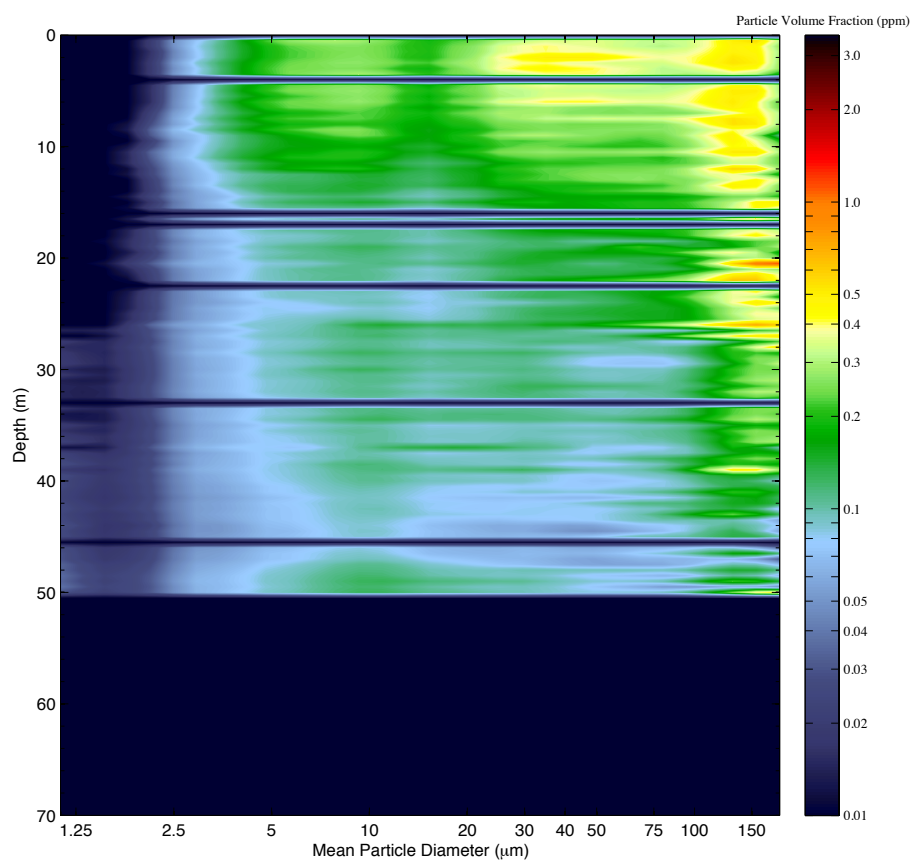
Bottle Nutrients and Chlorophyll

BIOSPACE 2010 Cast 39

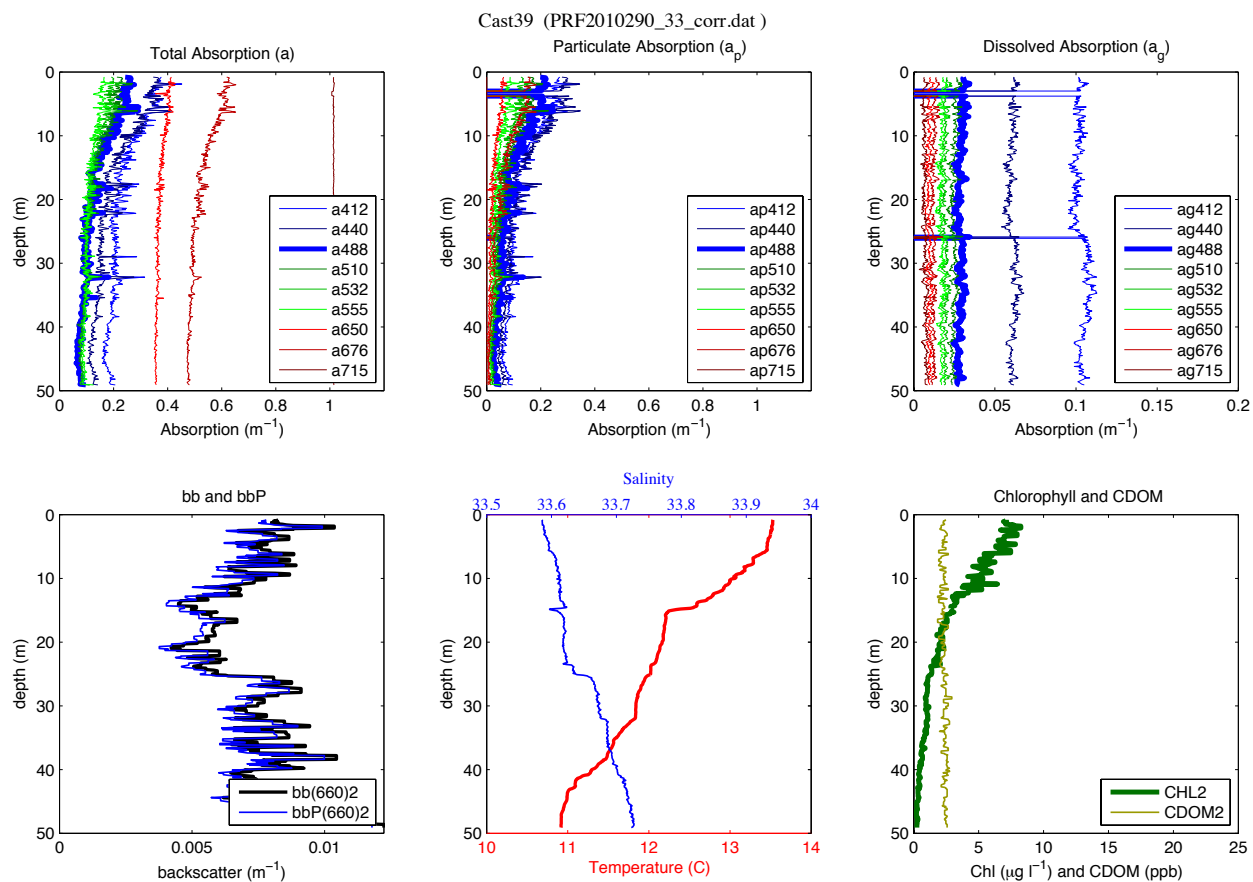


LISST

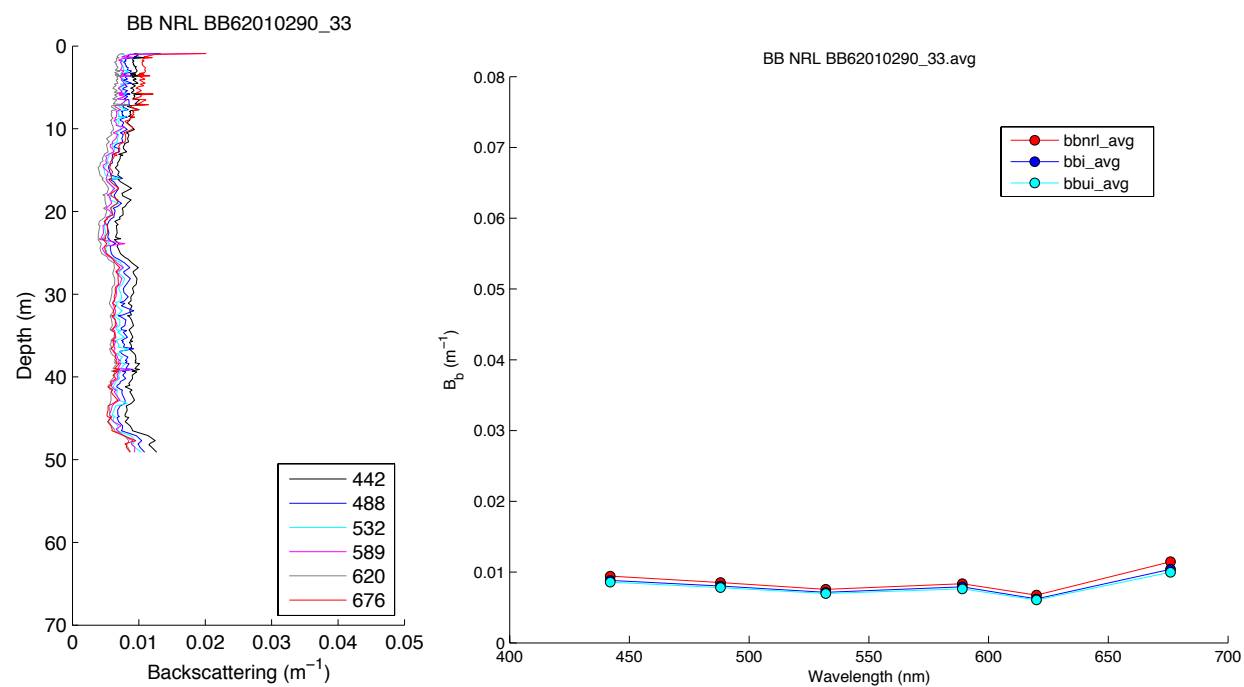
LISST – Cast 39



Optics Profile Package

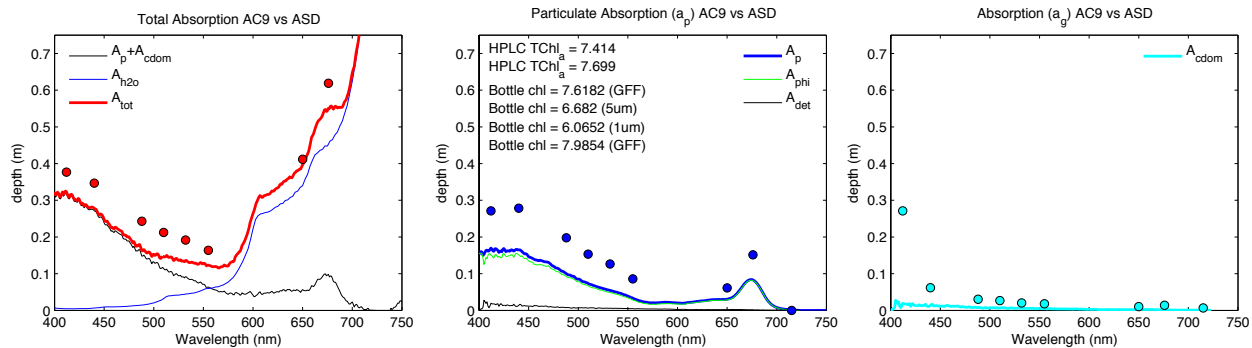


HydroScat

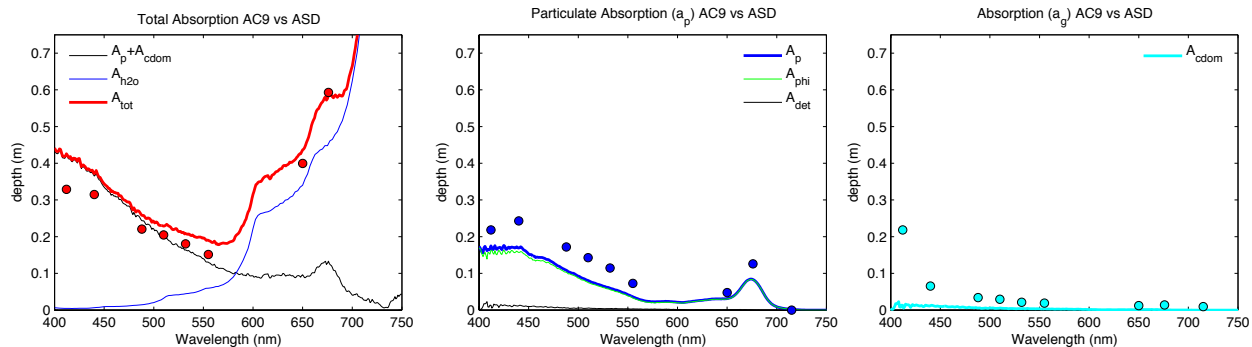


Filter Pad Absorption (w/ AC9)

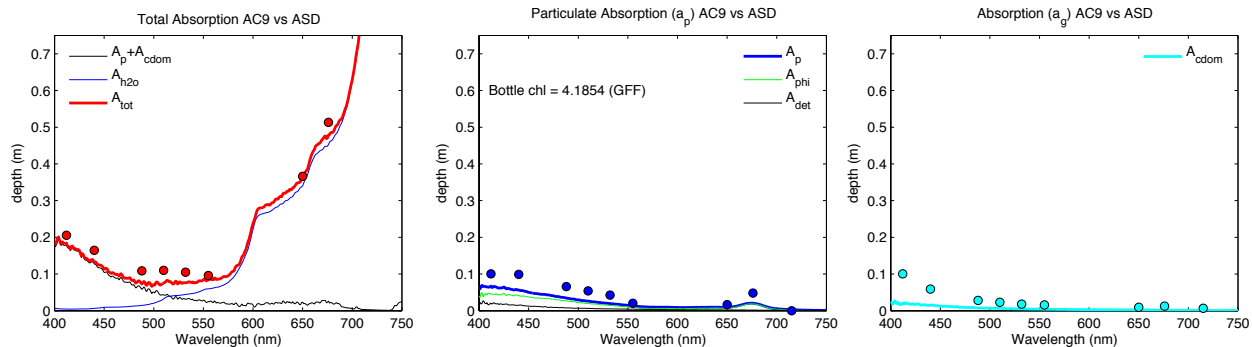
AC9 vs ASD Cast 39 – 0m (PRF2010290_33_corr.dat) Timeseries 6



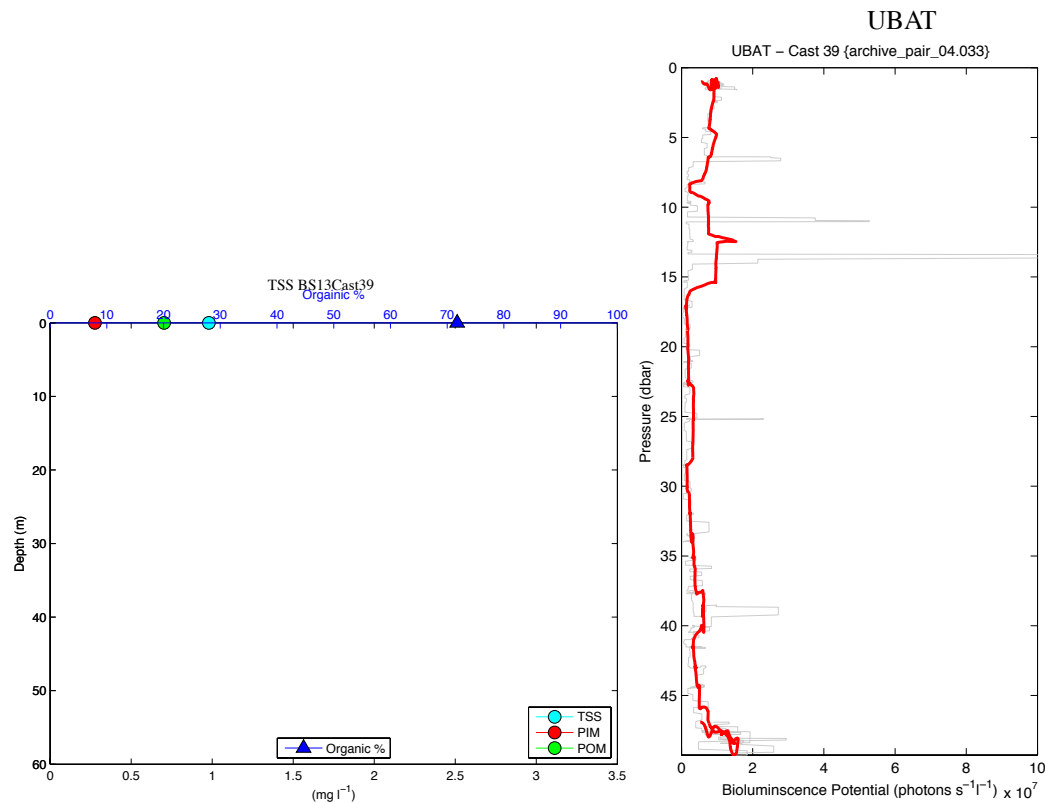
AC9 vs ASD Cast 39 – 7m (PRF2010290_33_corr.dat) Timeseries 6



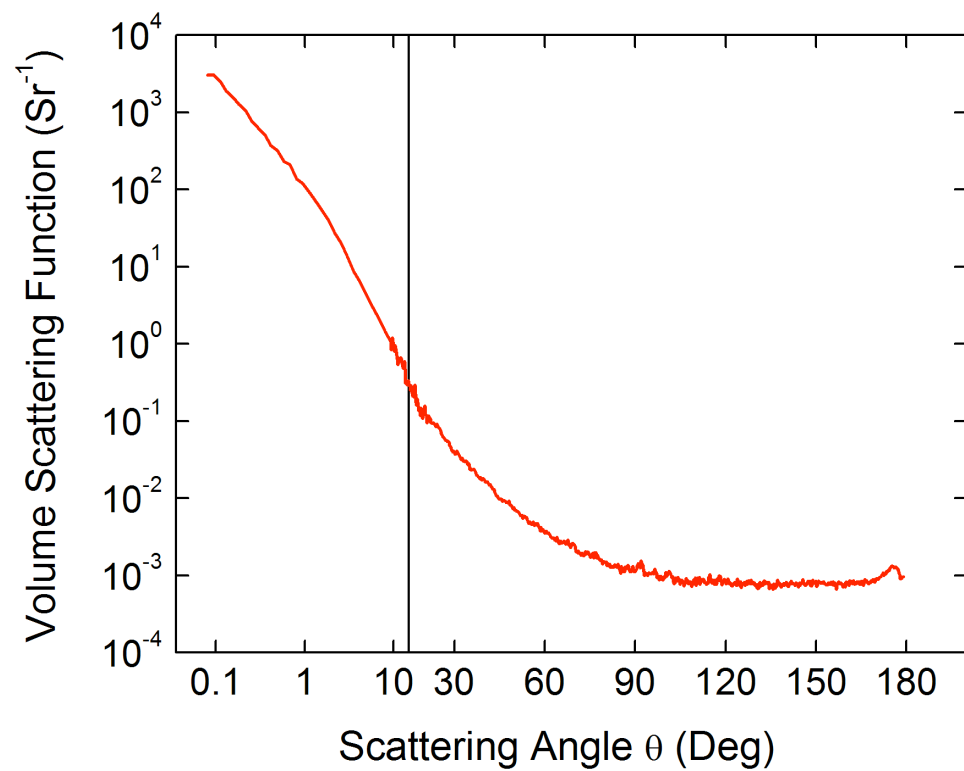
AC9 vs ASD Cast 39 – 20m (PRF2010290_33_corr.dat) Timeseries 6



TSS



MVSM

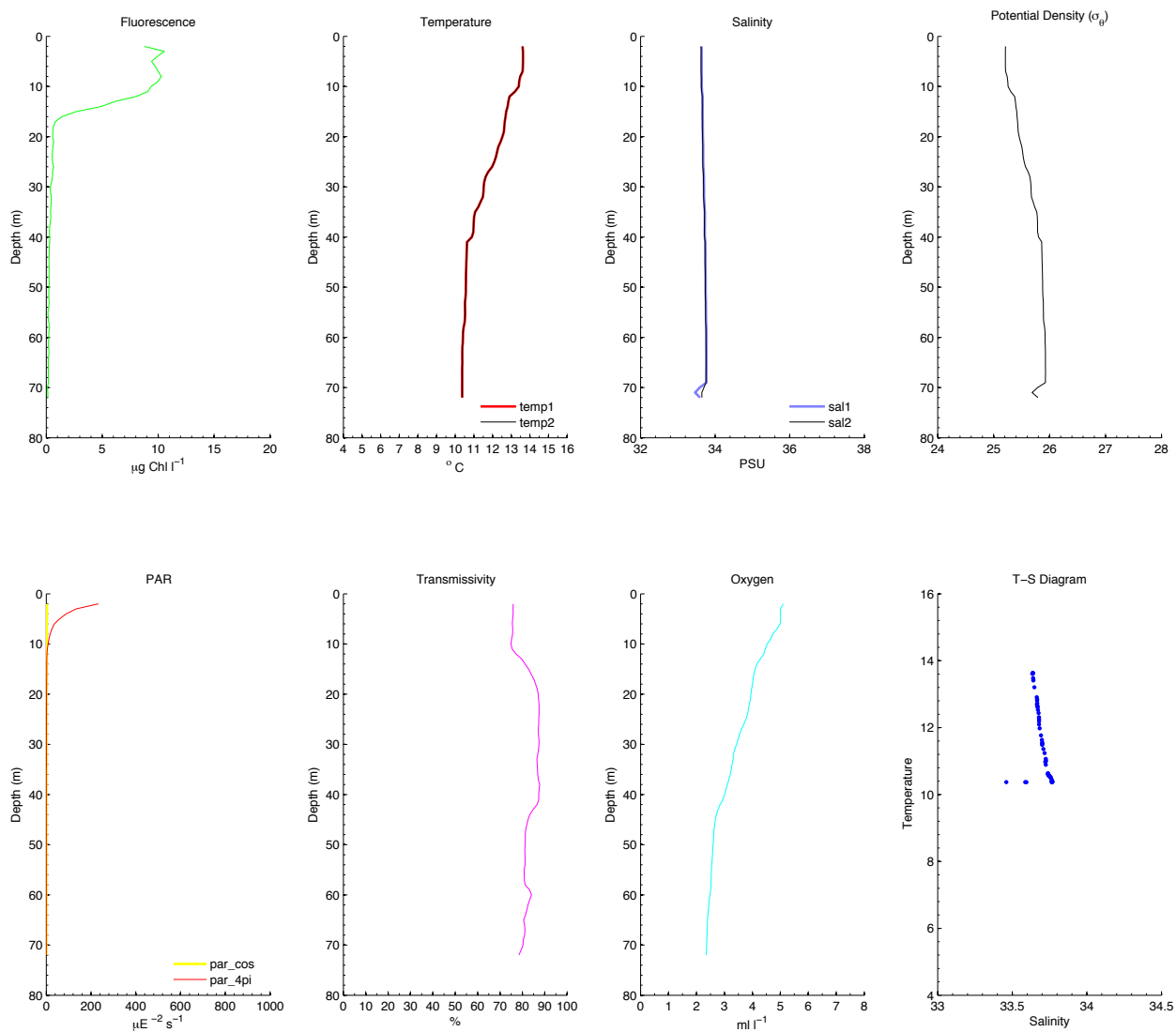


Cast 40 (1457 PDT; [Station BS16](#))

(*Prorocentrum* bloom - monospecific) (overcast)

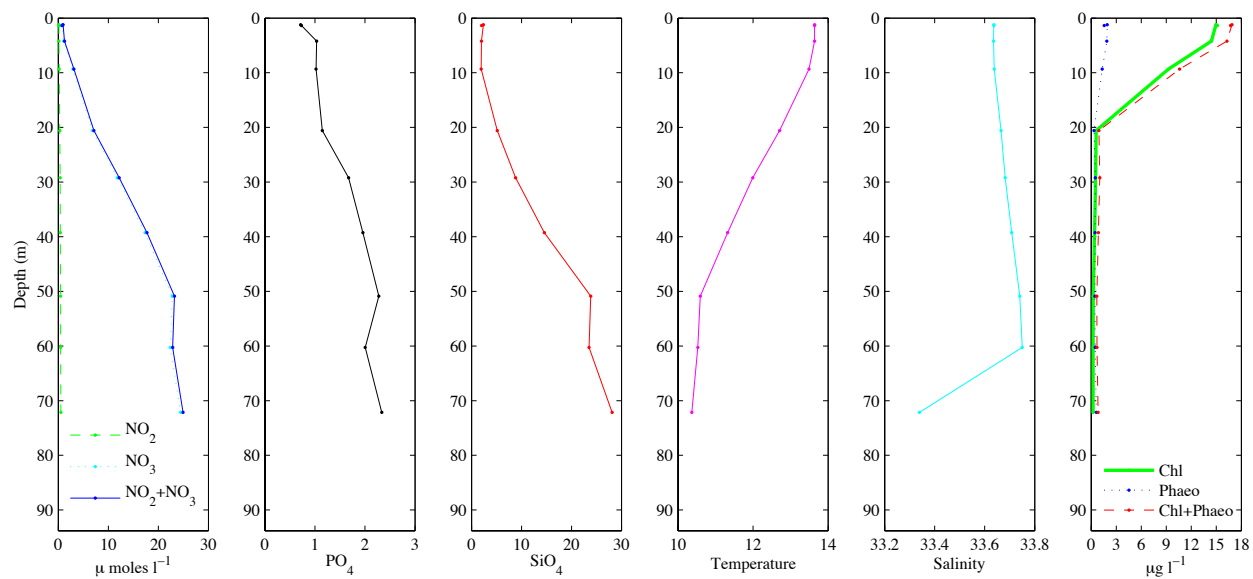
CTD

BIOSPACE 2010 Cast 40 (CTD16; 2010-10-17 21:59:00.000 UTC) CTD Downcast Data (Calibrated)



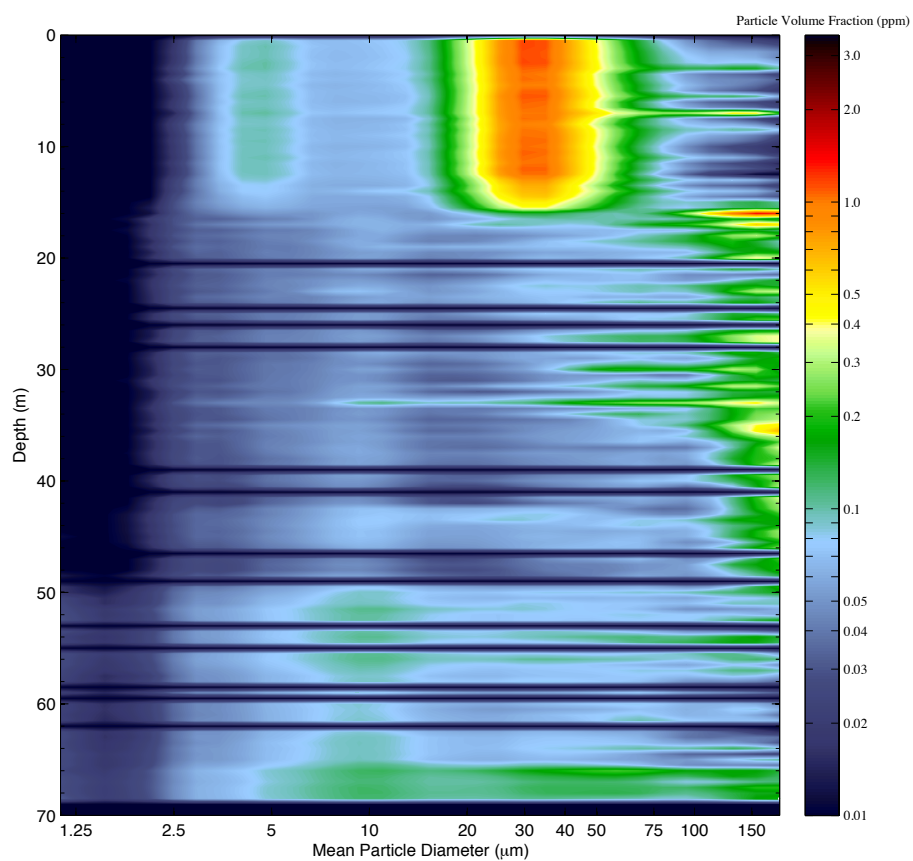
Bottle Nutrients and Chlorophyll

BIOSPACE 2010 Cast 40

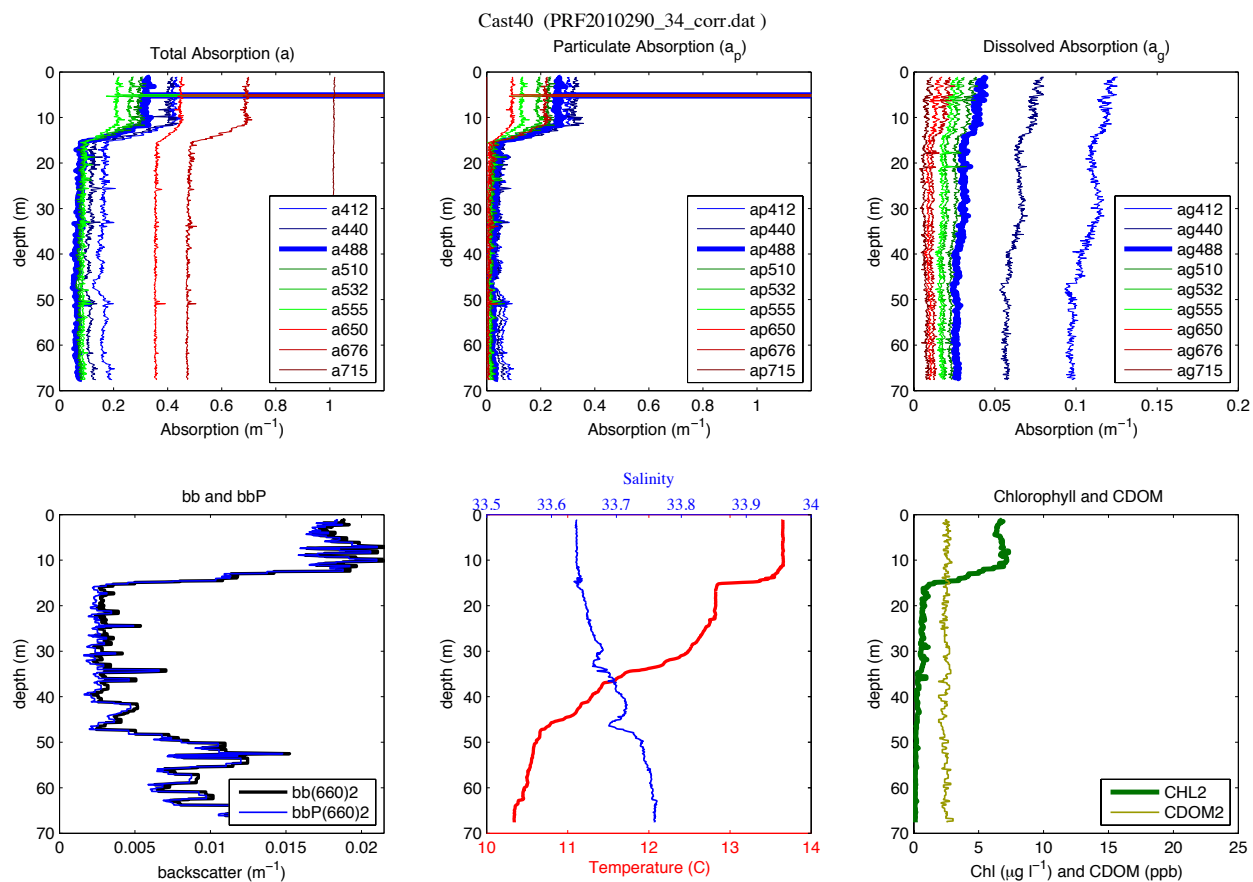


LISST

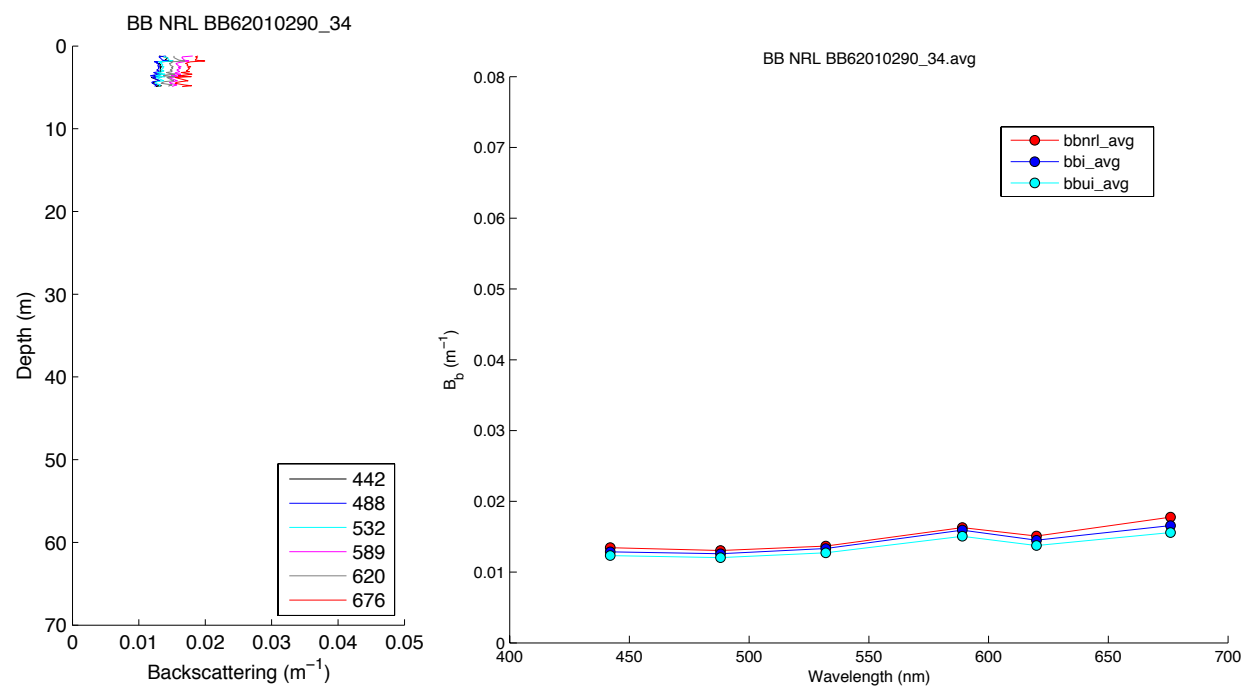
LISST – Cast 40



Optics Profile Package

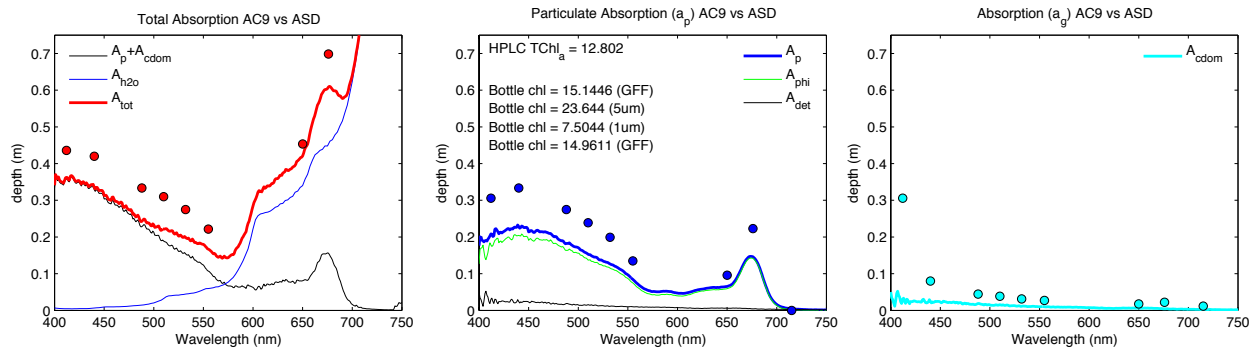


HydroScat

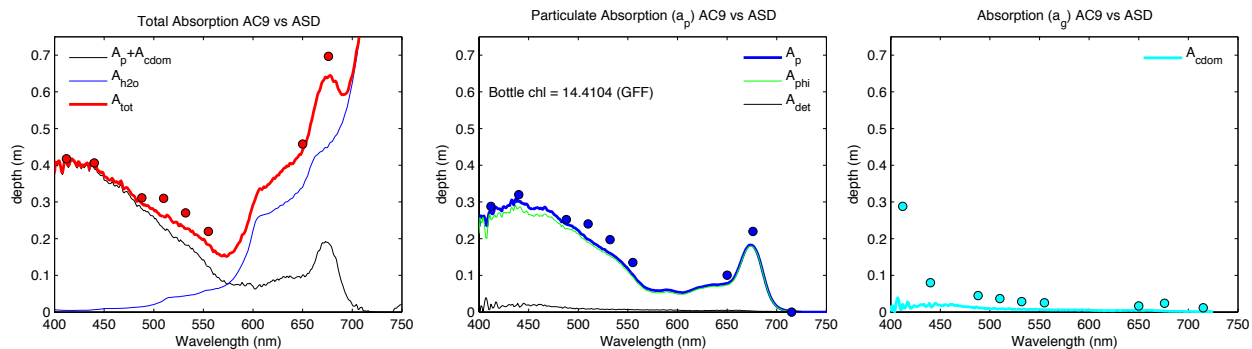


Filter Pad Absorption (w/ AC9)

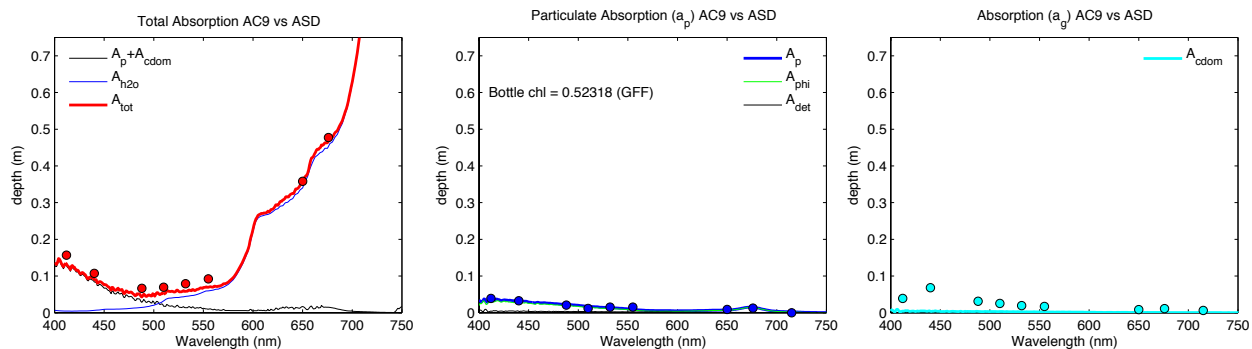
AC9 vs ASD Cast 40 – 0m (PRF2010290_34_corr.dat) Timeseries 7



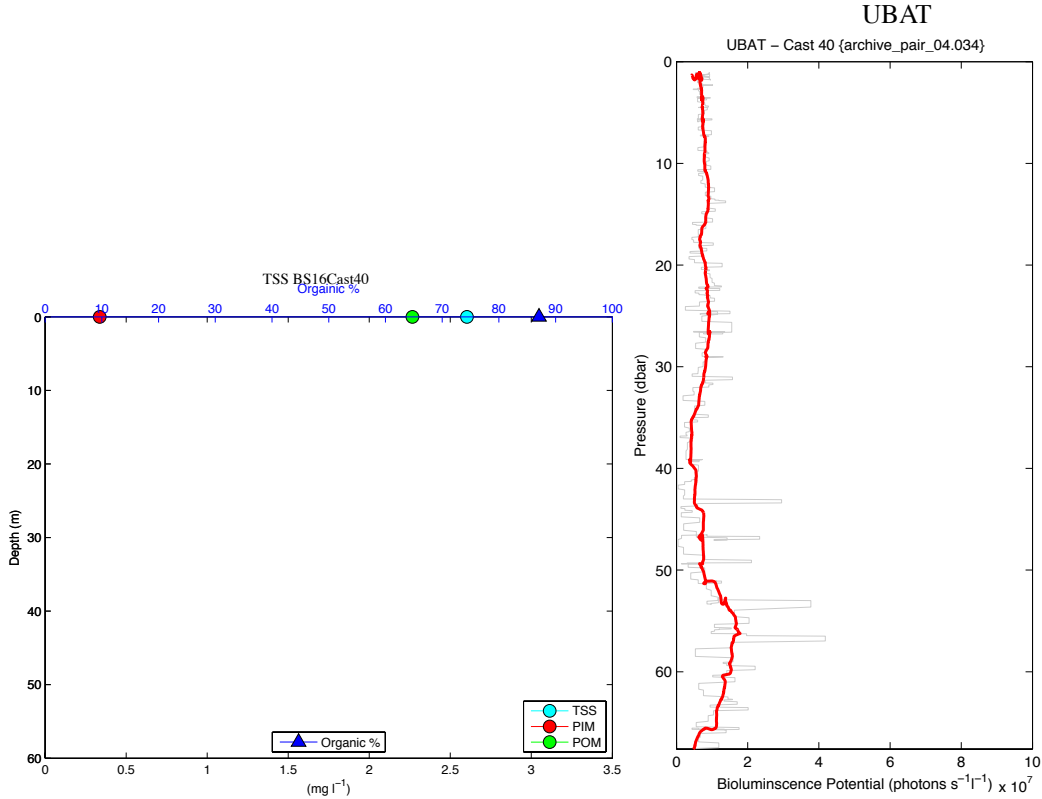
AC9 vs ASD Cast 40 – 5m (PRF2010290_34_corr.dat) Timeseries 7



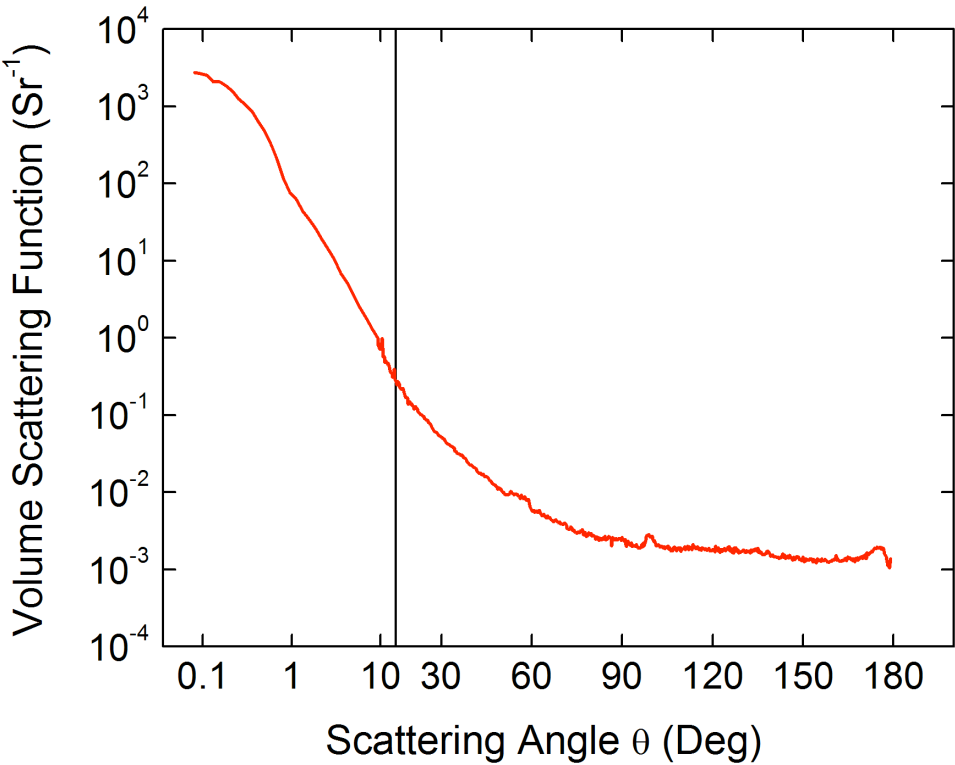
AC9 vs ASD Cast 40 – 30m (PRF2010290_34_corr.dat) Timeseries 7



TSS



MVSM

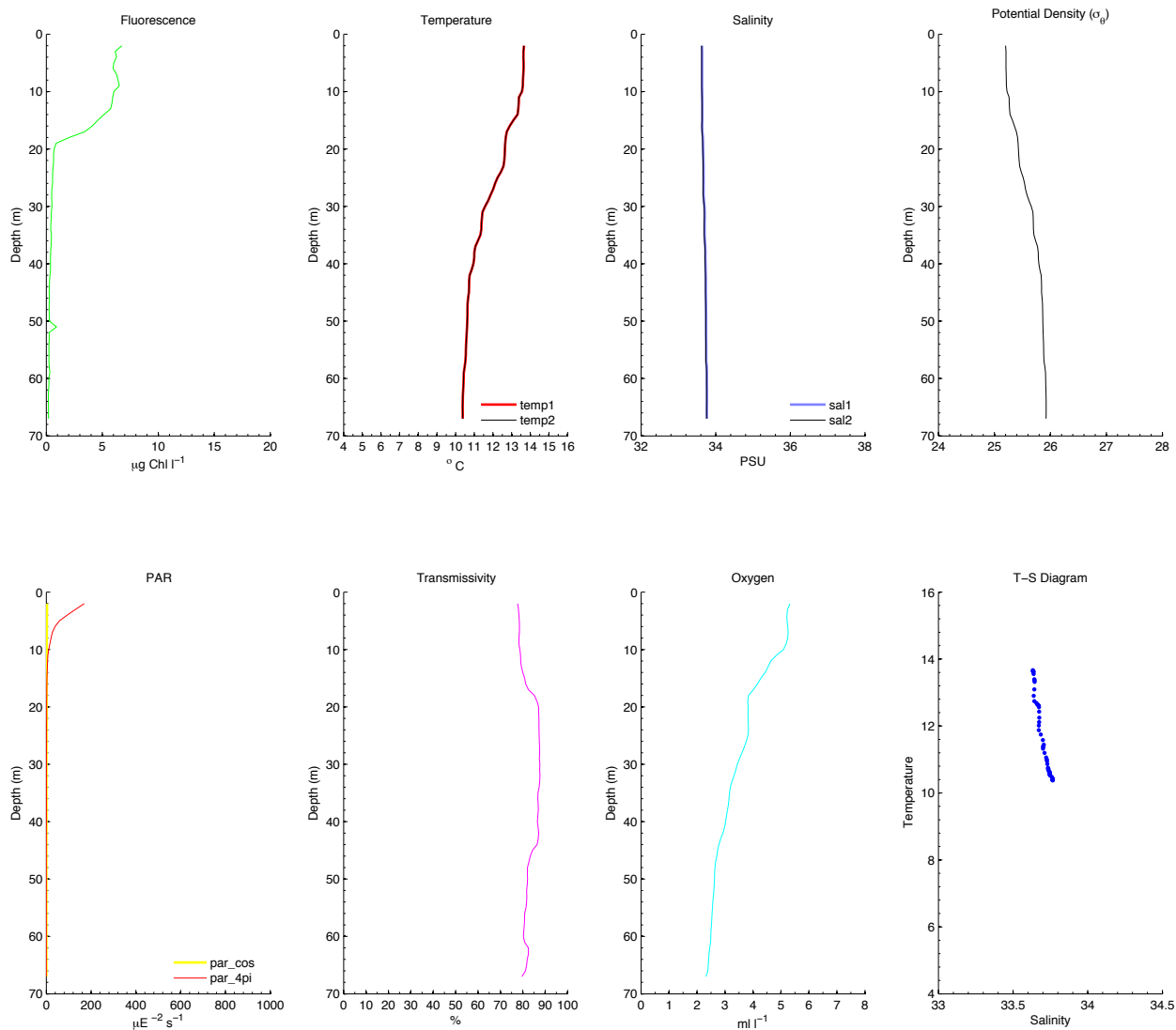


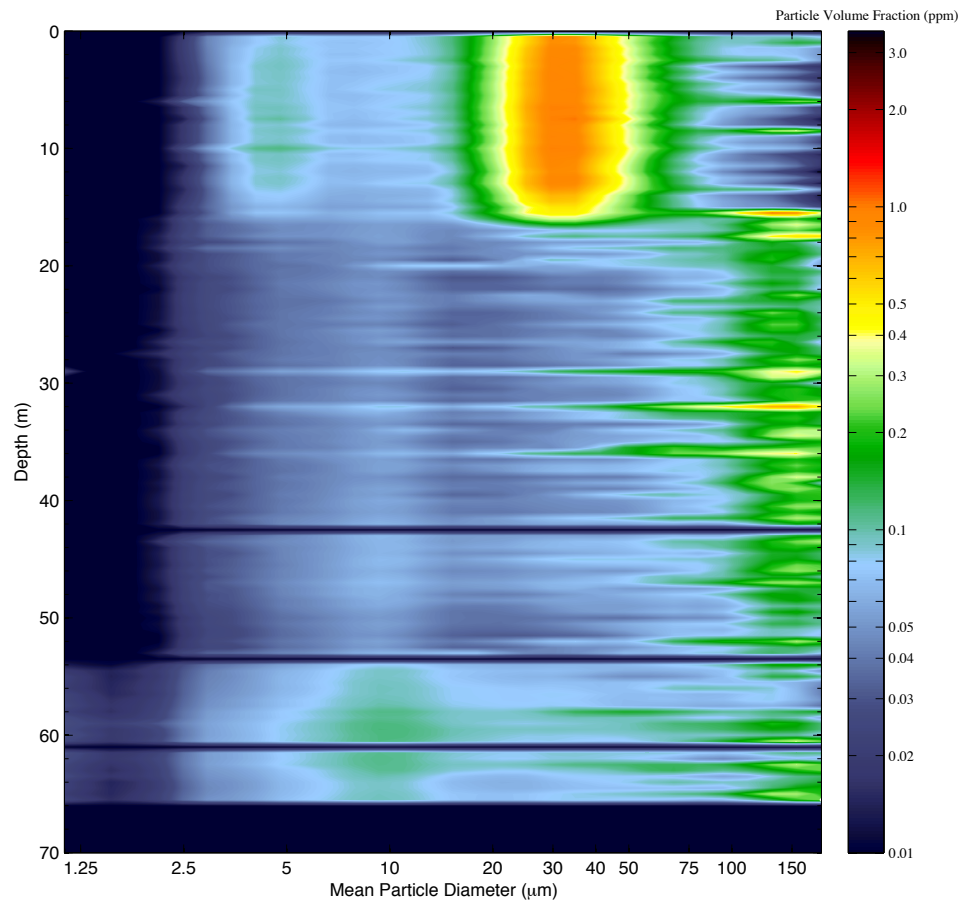
Cast 41 (1630 PDT; [Station BS16](#))

(CTD +optics +hyperpro+ plankton net + CTD flourometer; NO water samples, no vertical migration)
(overcast, but clearing)

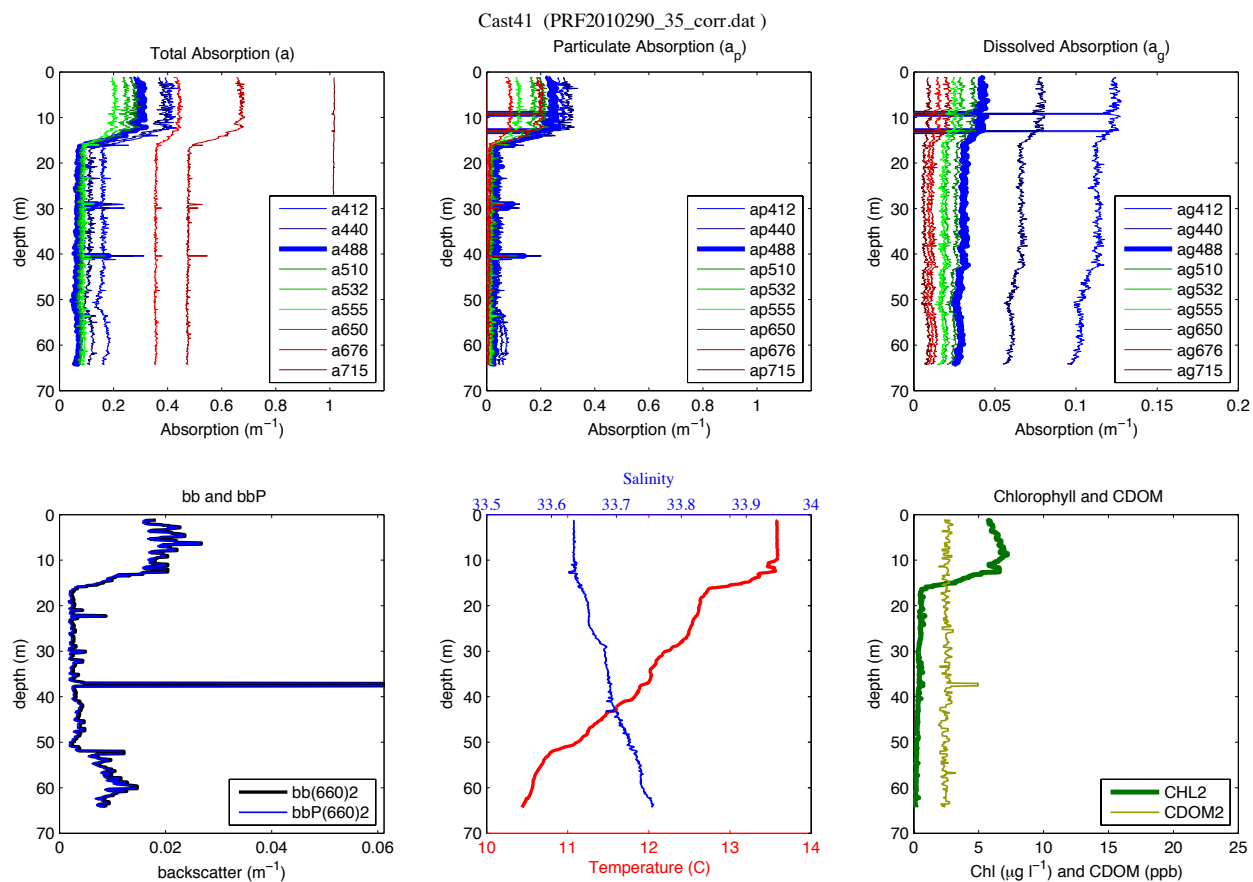
CTD

BIOSPACE 2010 Cast 41 (CTD16; 2010-10-17 23:26:49.000 UTC) CTD Downcast Data (Calibrated)

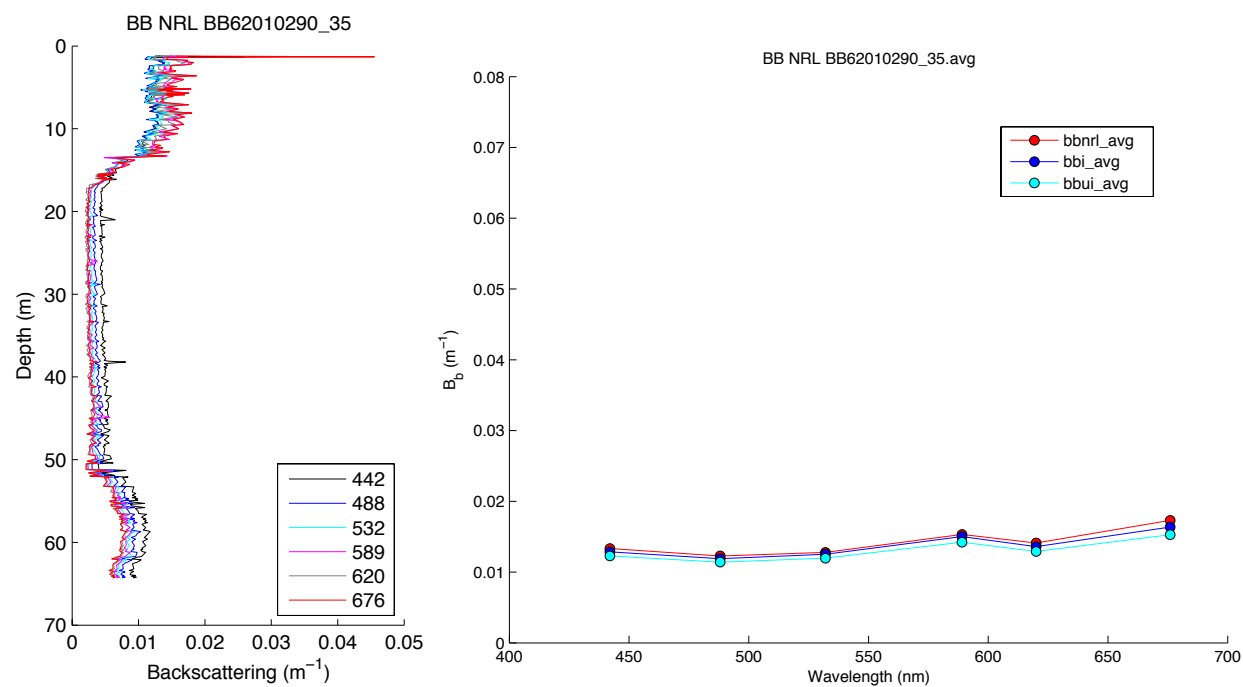




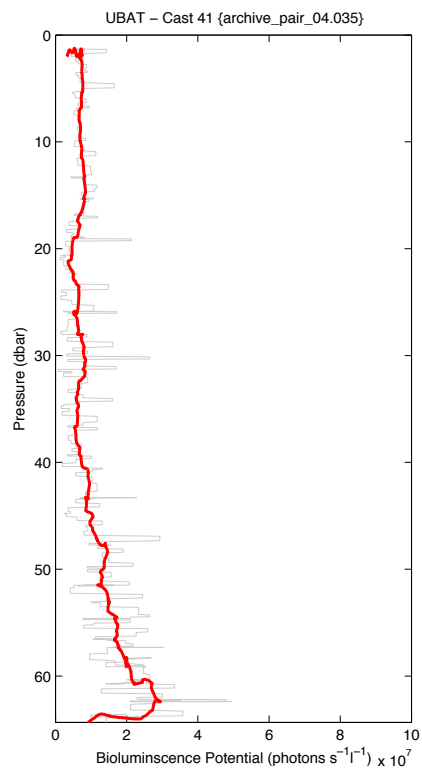
Optics Profile Package



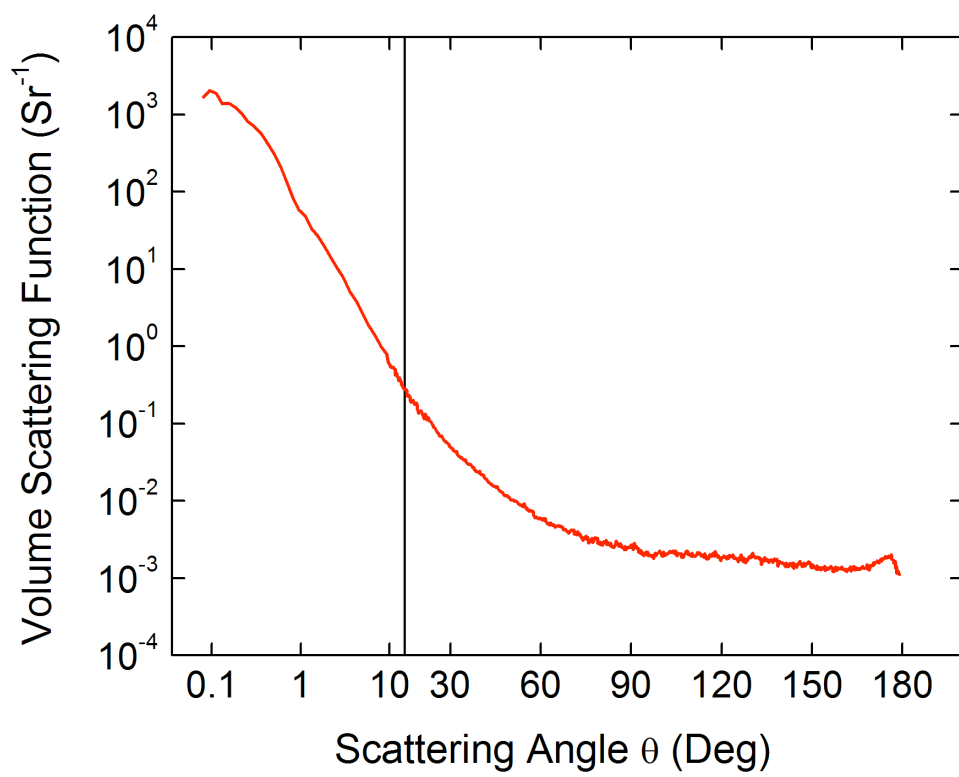
HydroScat



UBAT

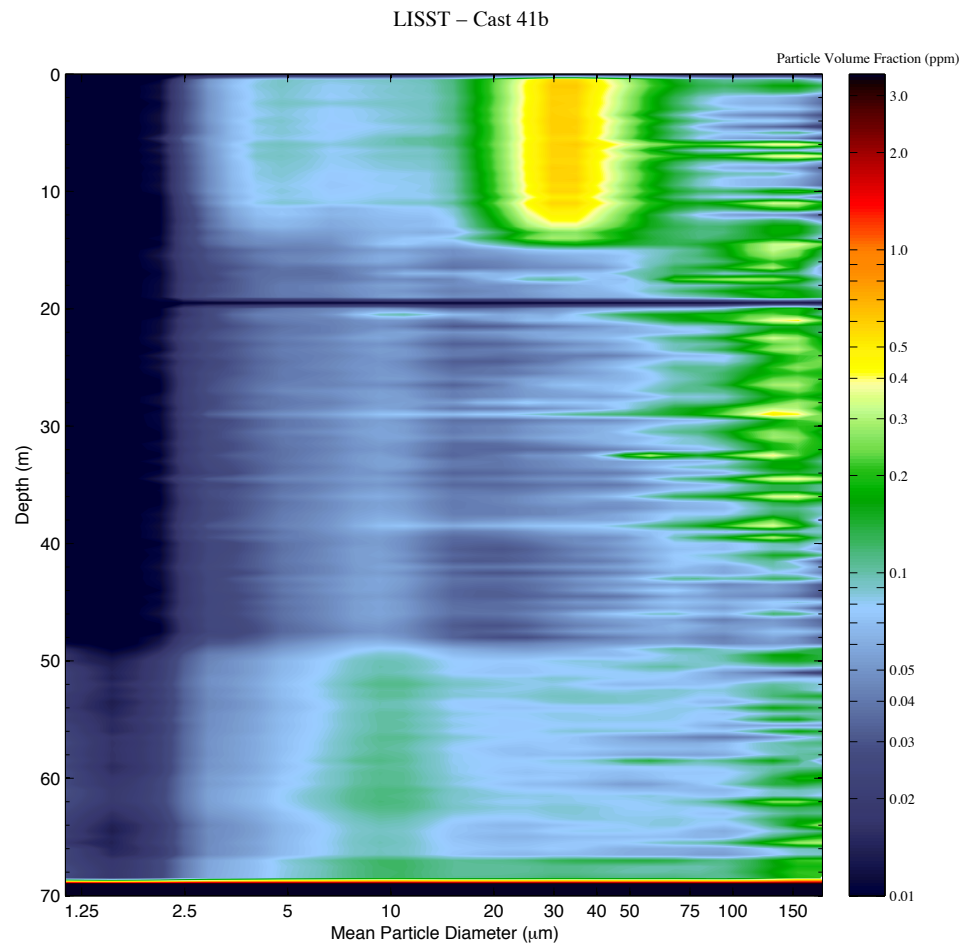


MVSM

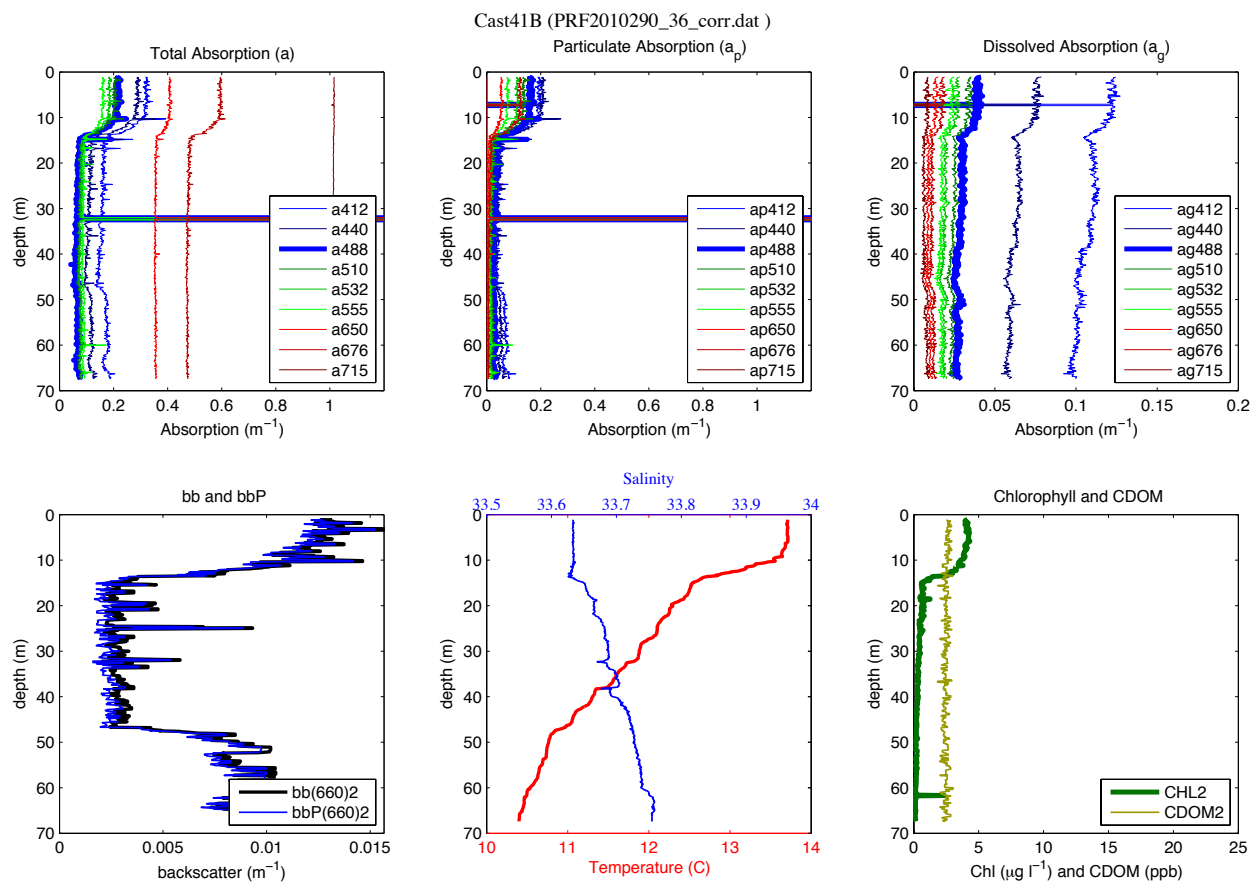


Cast 41B (1730 PDT; [Station BS16](#))
(Optics only) (partly sunny)

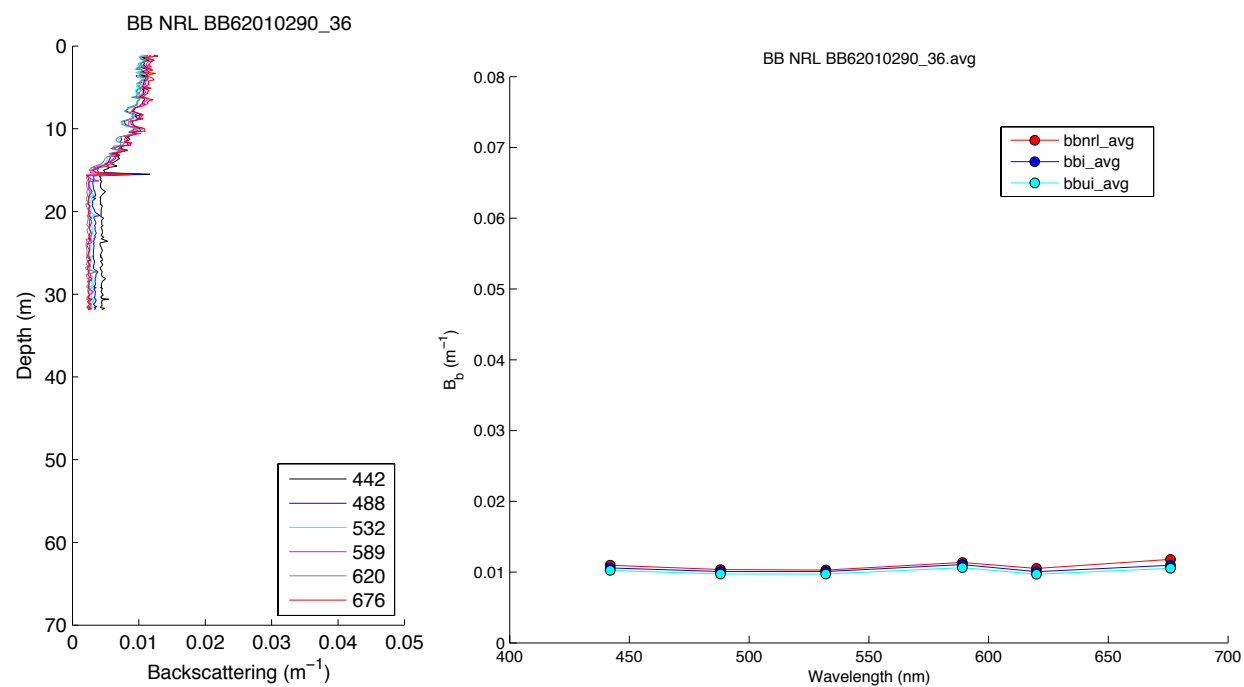
LISST



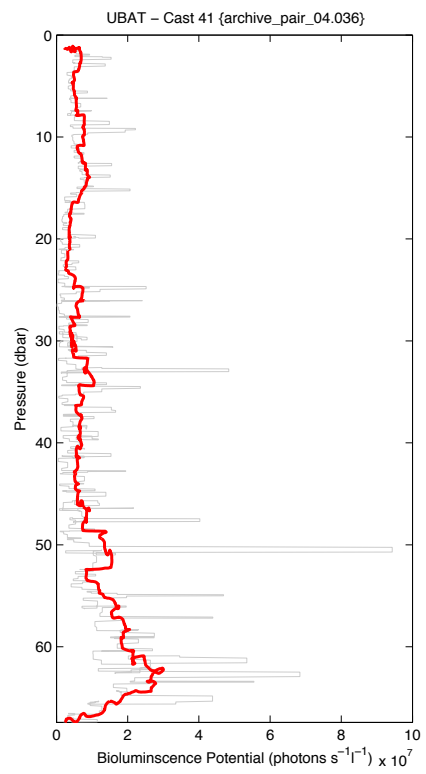
Optics Profile Package



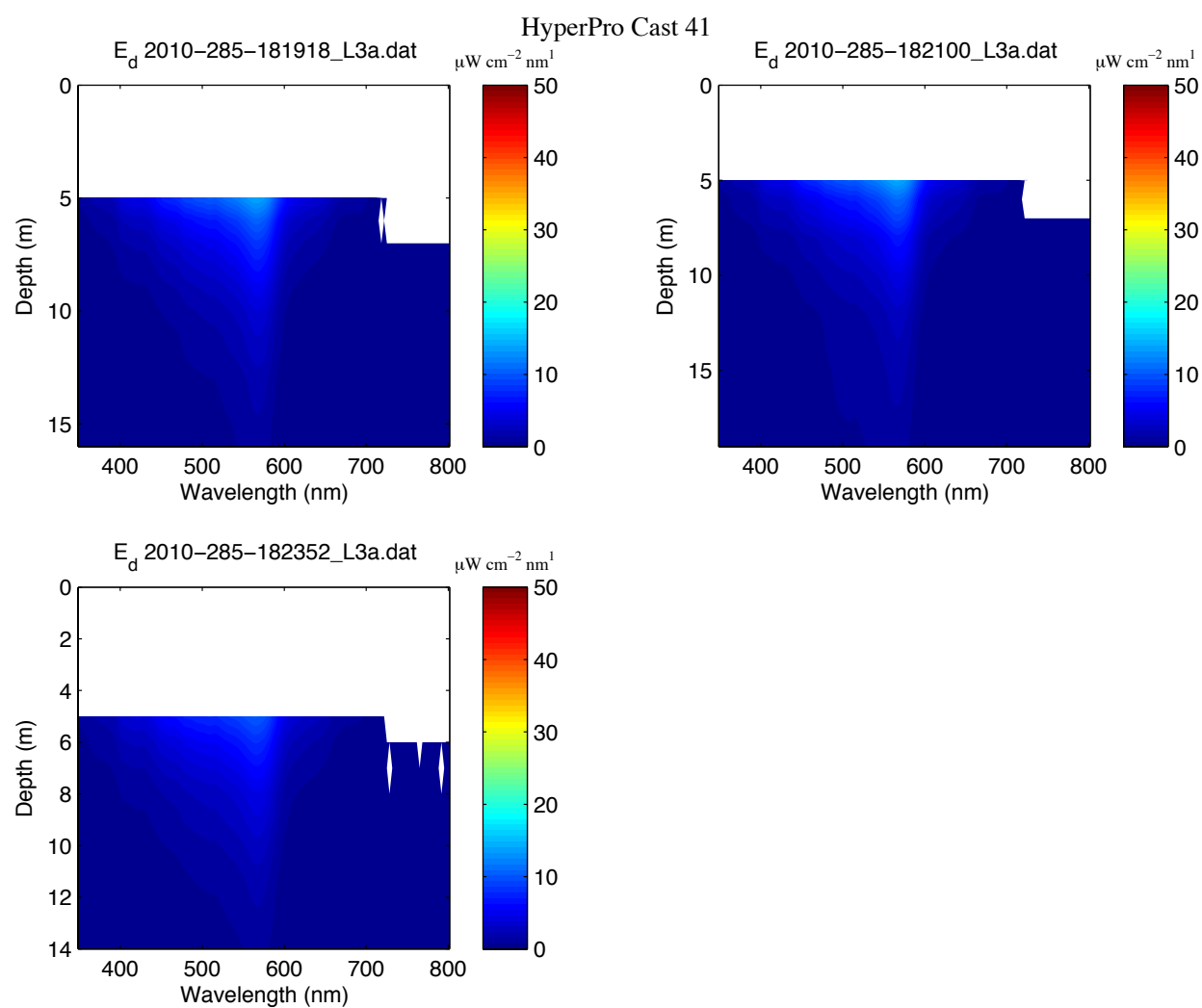
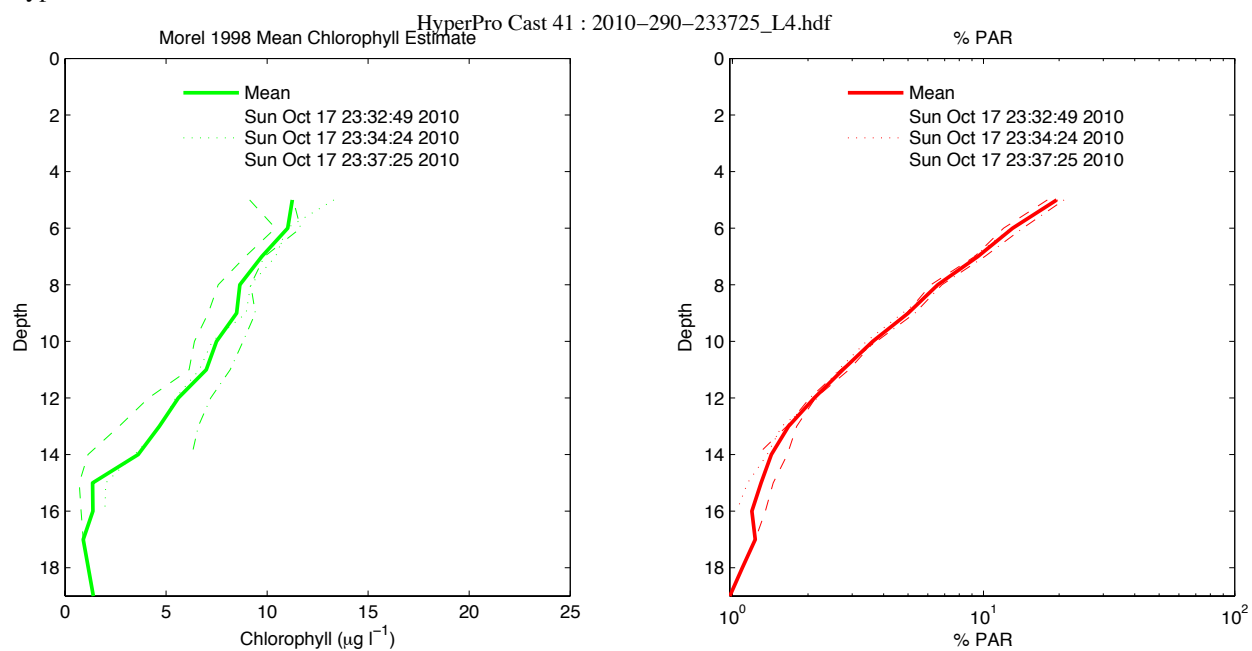
HydroScat



UBAT



HyperPro

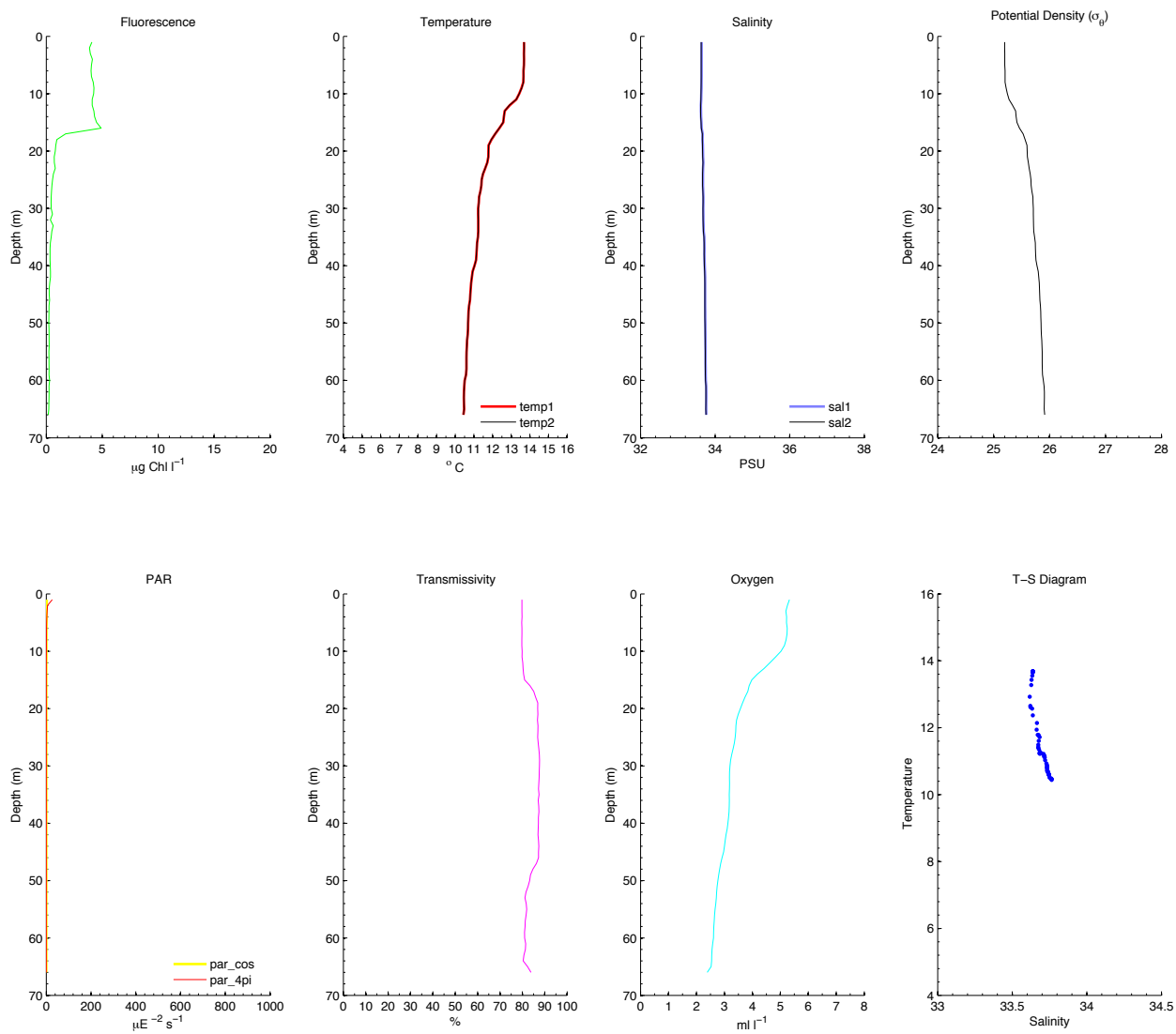


Cast 42 (1830 PDT; [Station BS16](#))

(plankton net -still *prorocentrum micans*) (partly cloudy, sunset)

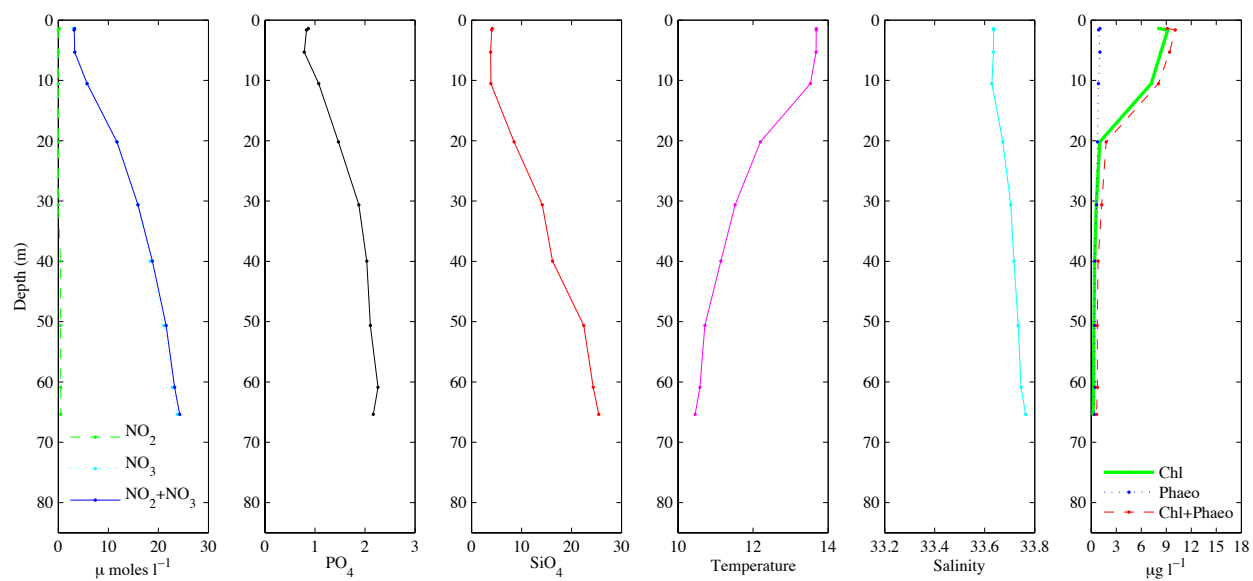
CTD

BIOSPACE 2010 Cast 42 (CTD16; 2010-10-18 01:32:00.000 UTC) CTD Downcast Data (Calibrated)



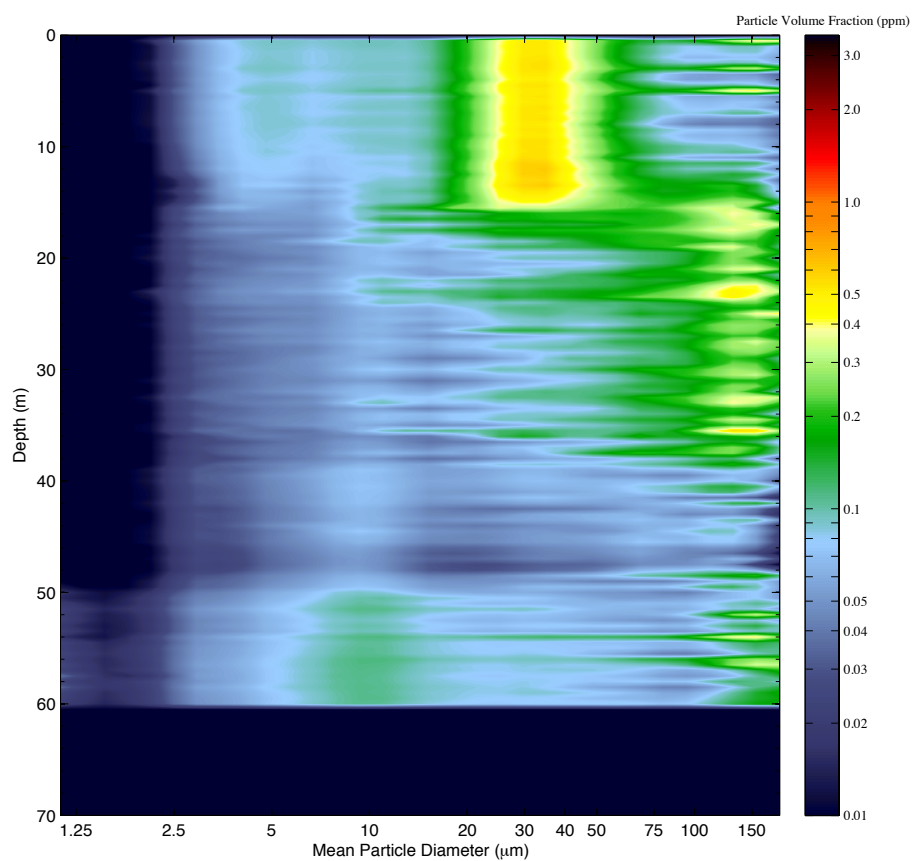
Bottle Nutrients and Chlorophyll

BIOSPACE 2010 Cast 42

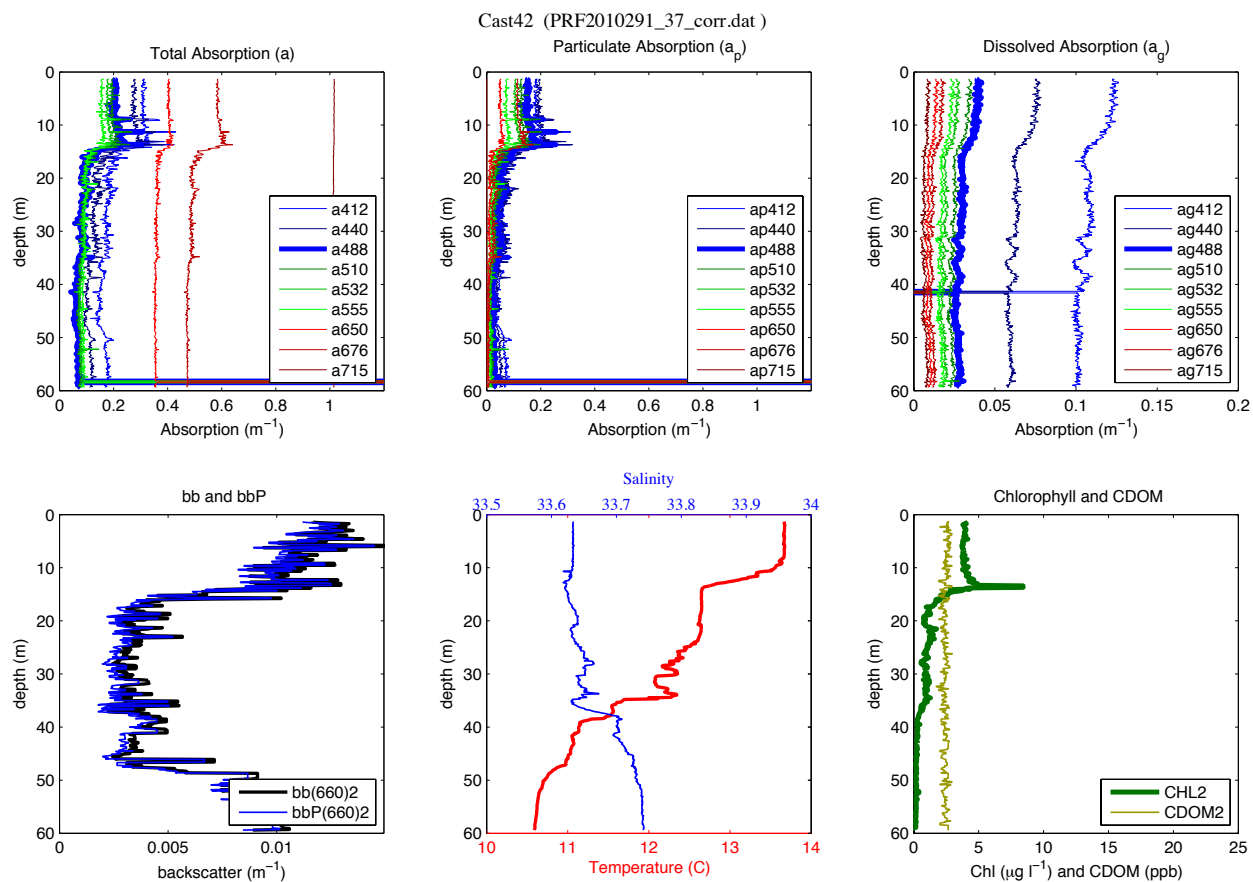


LISST

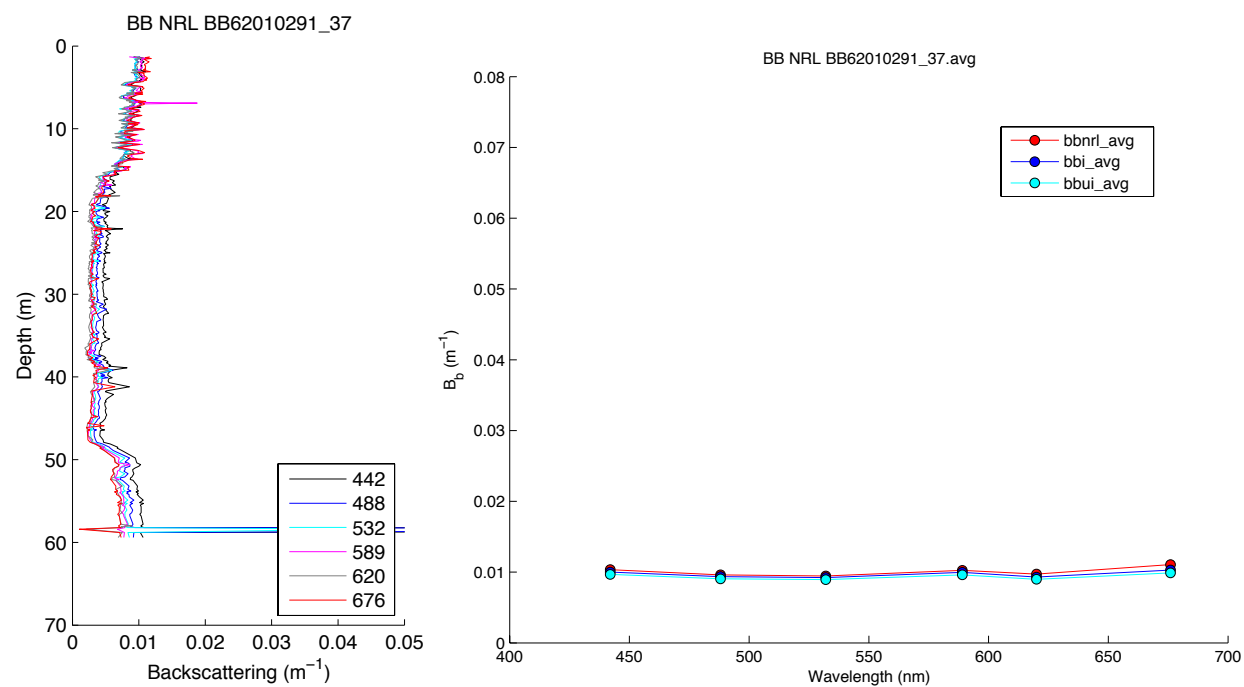
LISST – Cast 42



Optics Profile Package

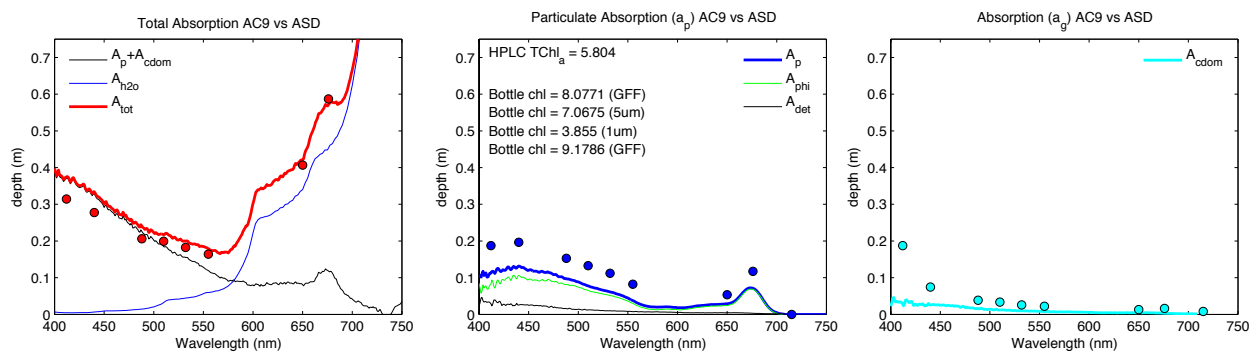


HydroScat

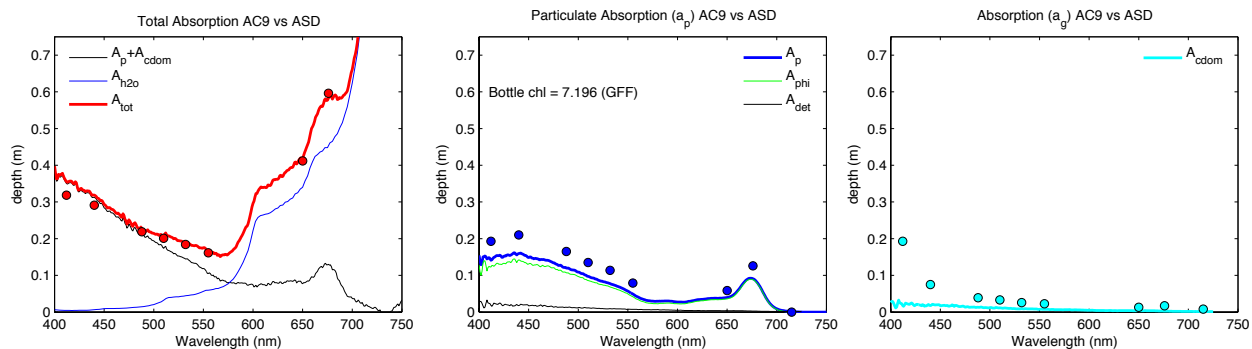


Filter Pad Absorption (w/ AC9)

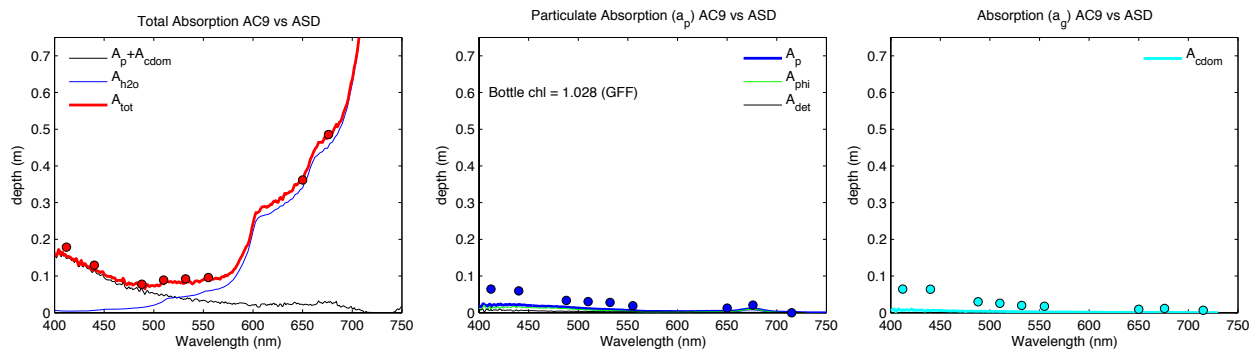
AC9 vs ASD Cast 42 – 0m (PRF2010291_37_corr.dat) Timeseries 8(CTD13)



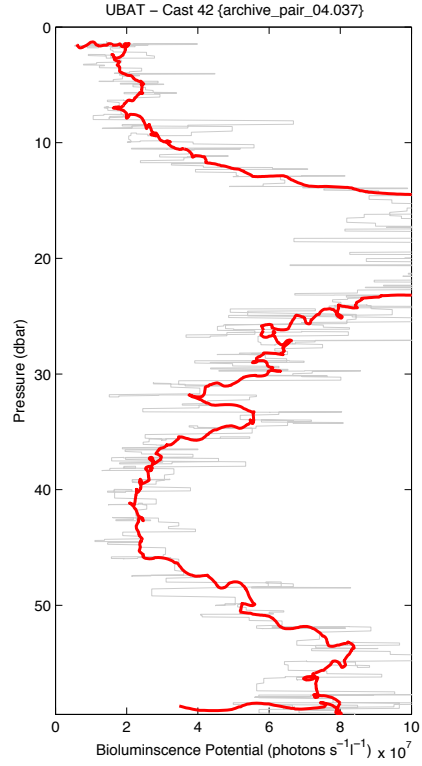
AC9 vs ASD Cast 42 – 10m (PRF2010291_37_corr.dat) Timeseries 8(CTD13)



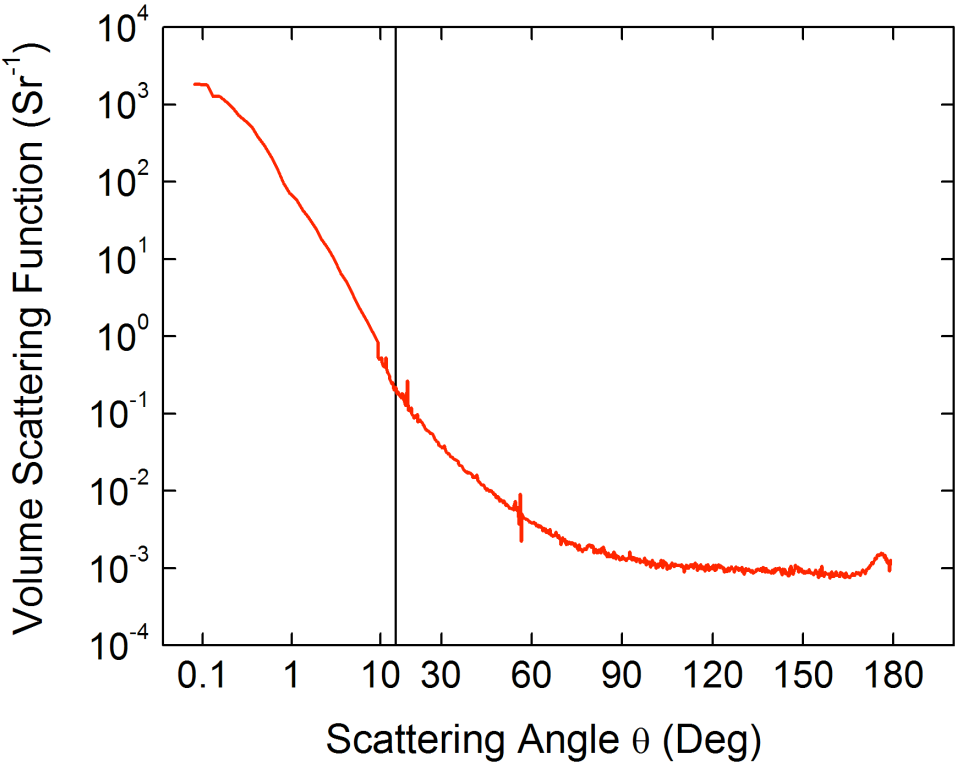
AC9 vs ASD Cast 42 – 20m (PRF2010291_37_corr.dat) Timeseries 8(CTD13)



UBAT



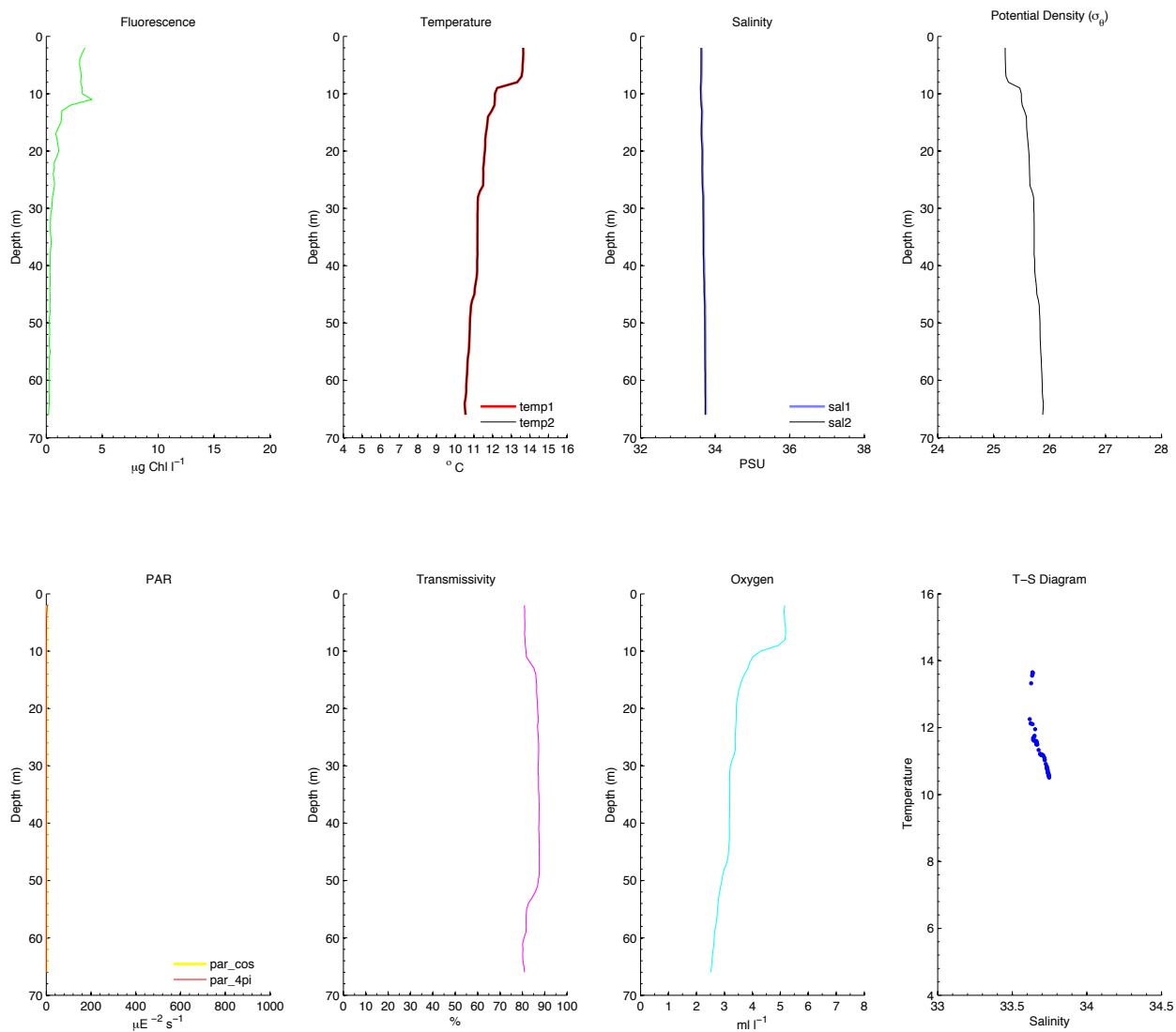
MVSM



Cast 43 (1930 PDT; [Station BS16](#))
(dark)

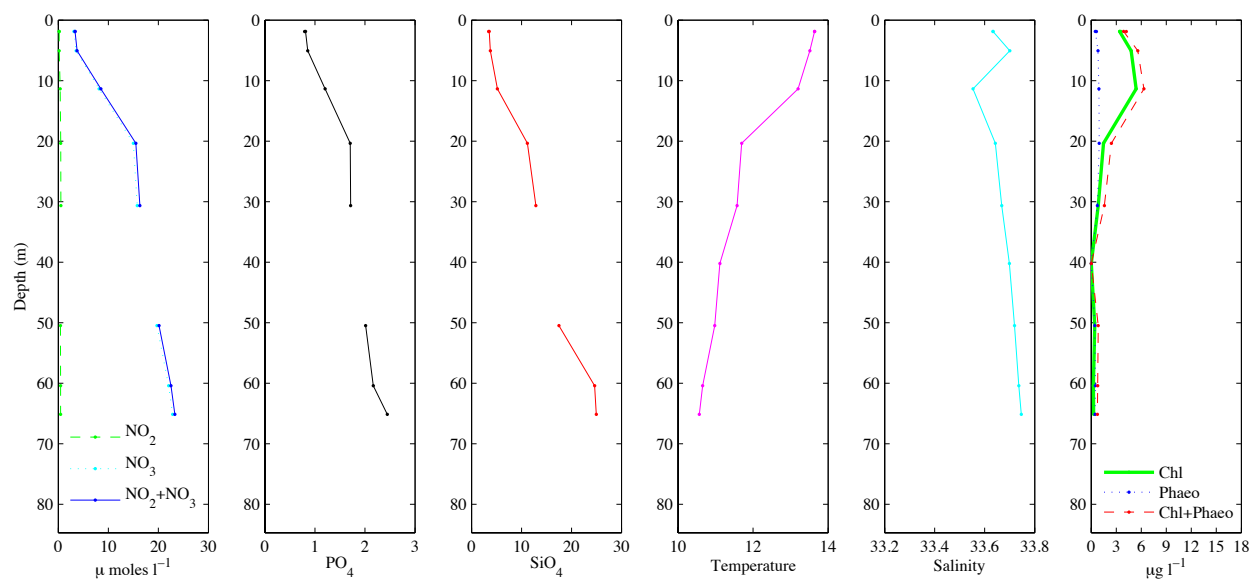
CTD

BIOSPACE 2010 Cast 43 (CTD16; 2010-10-18 02:32:00.000 UTC) CTD Downcast Data (Calibrated)



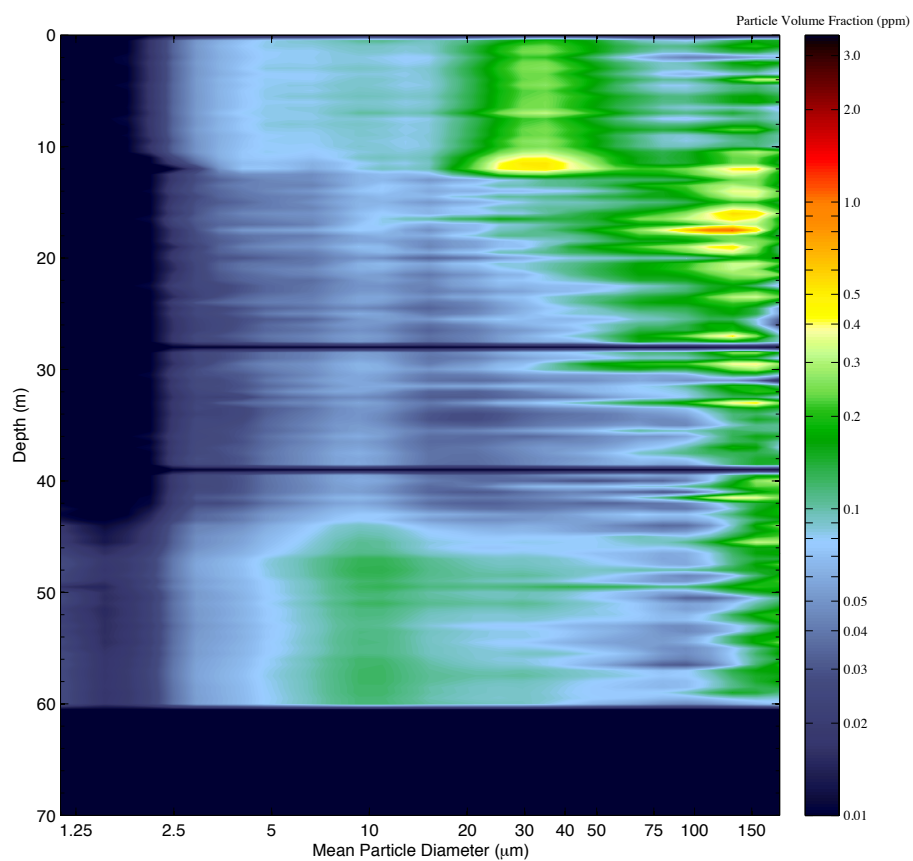
Bottle Nutrients and Chlorophyll

BIOSPACE 2010 Cast 43

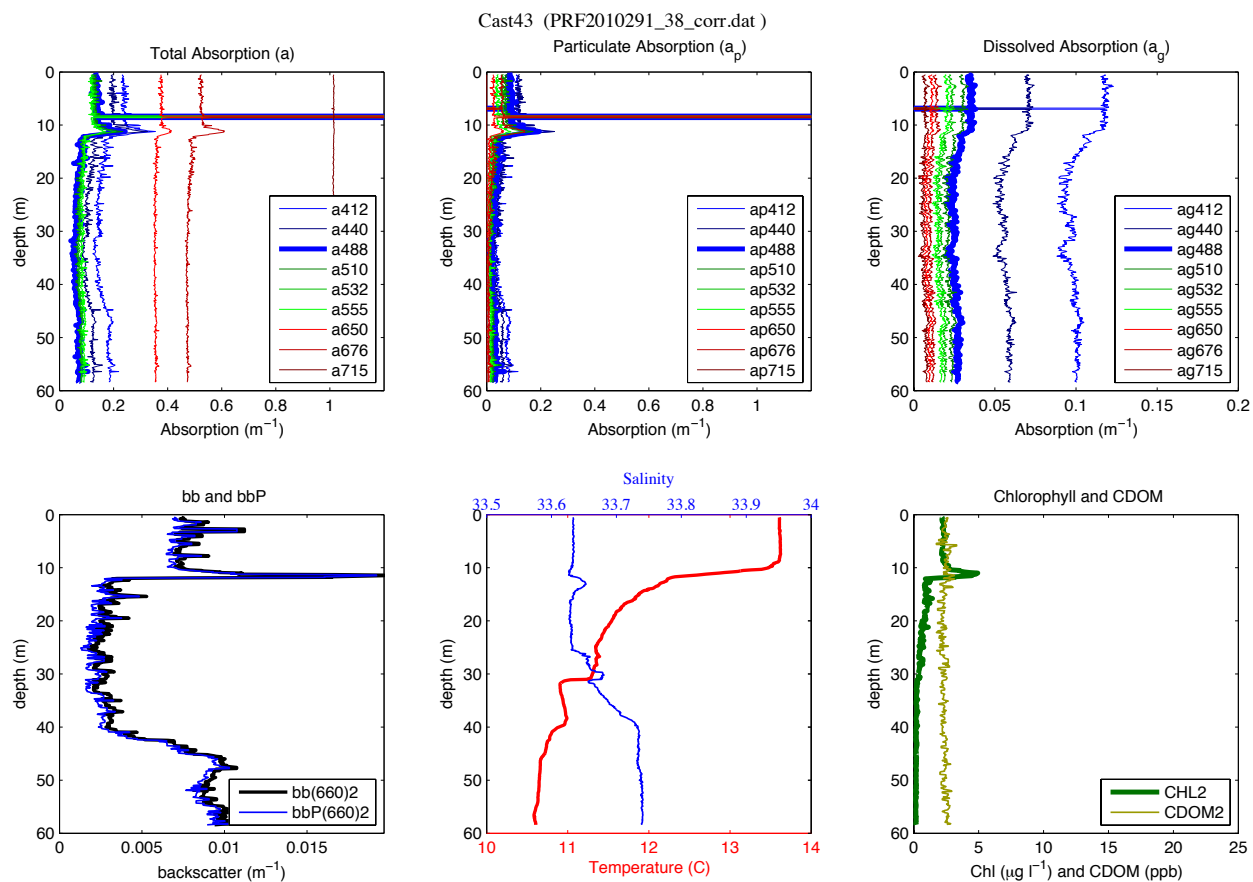


LISST

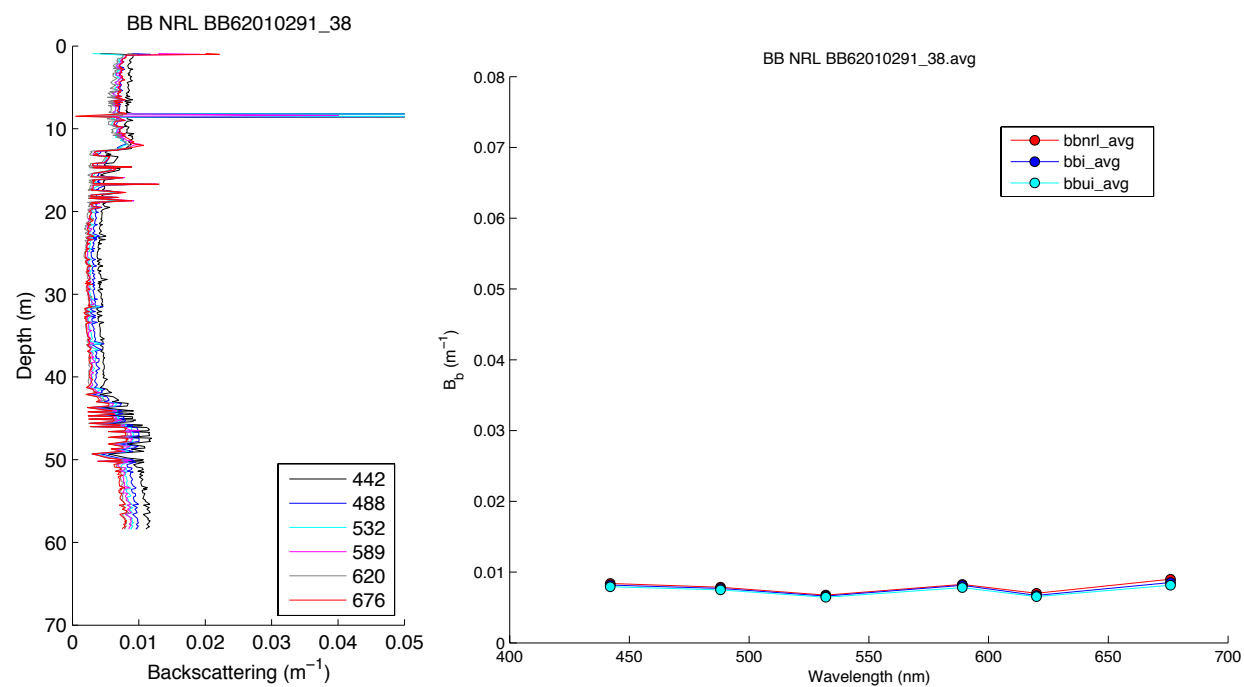
LISST – Cast 43



Optics Profile Package

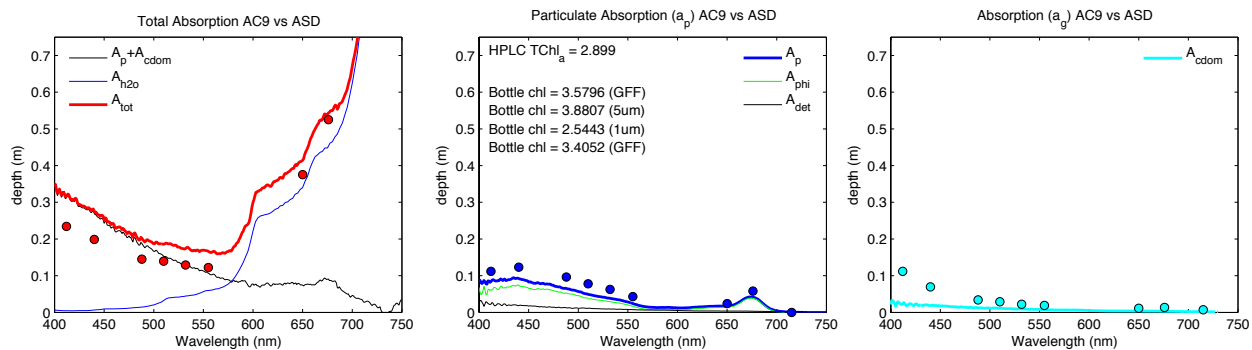


HydroScat

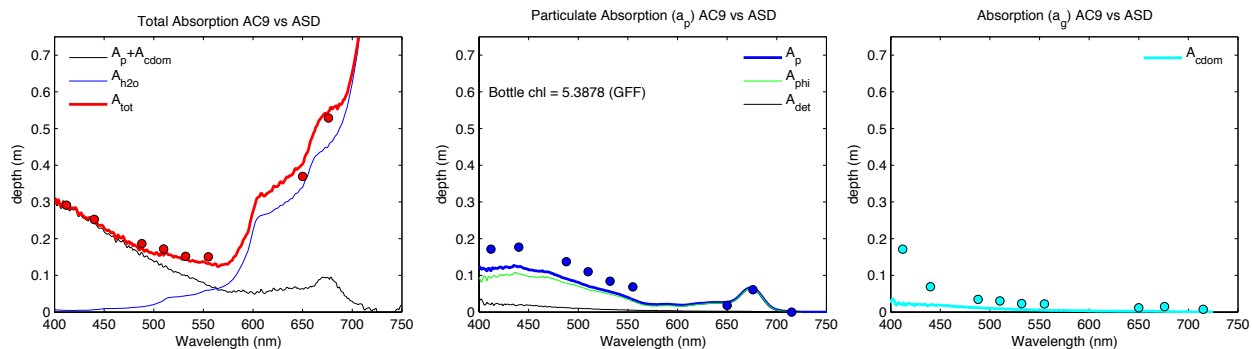


Filter Pad Absorption (w/ AC9)

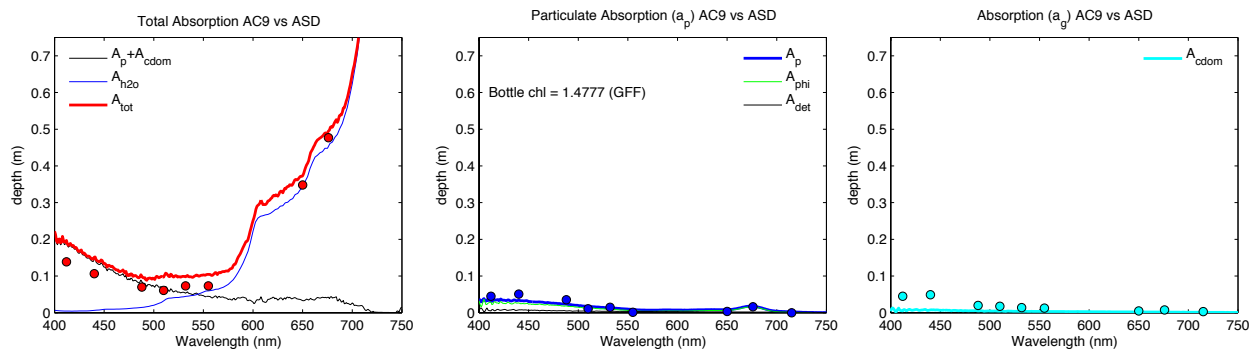
AC9 vs ASD Cast 43 – 0m (PRF2010291_38_corr.dat) CTD 16



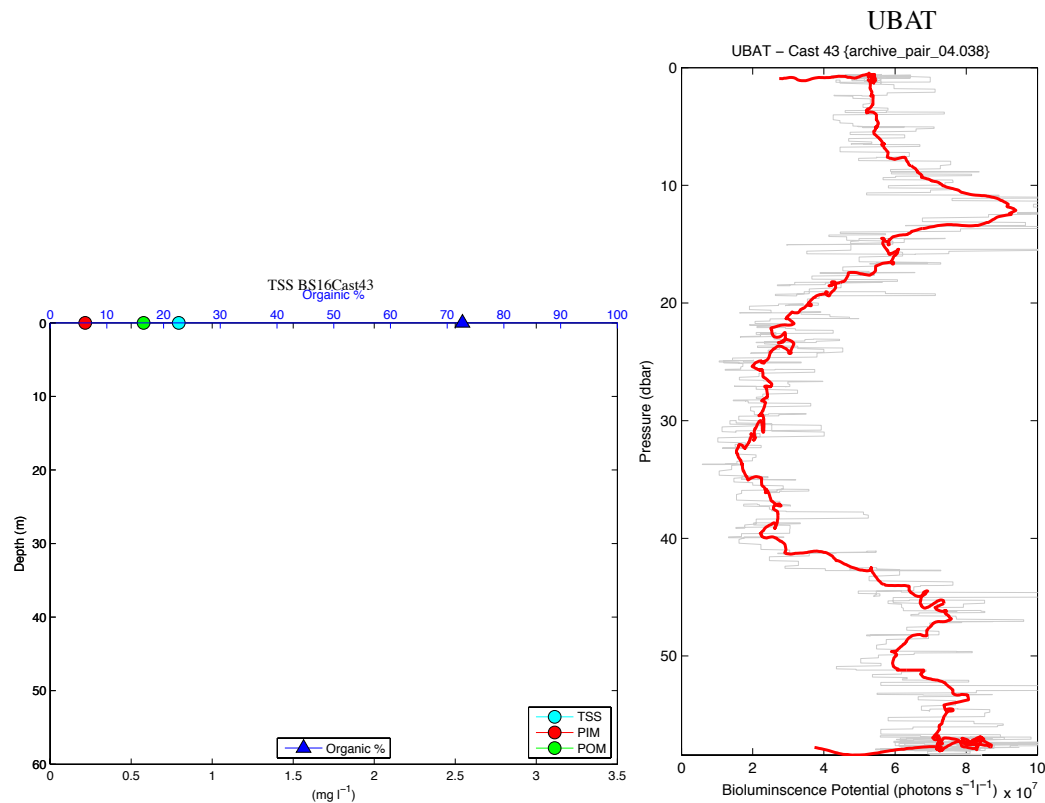
AC9 vs ASD Cast 43 – 10m (PRF2010291_38_corr.dat) CTD 16



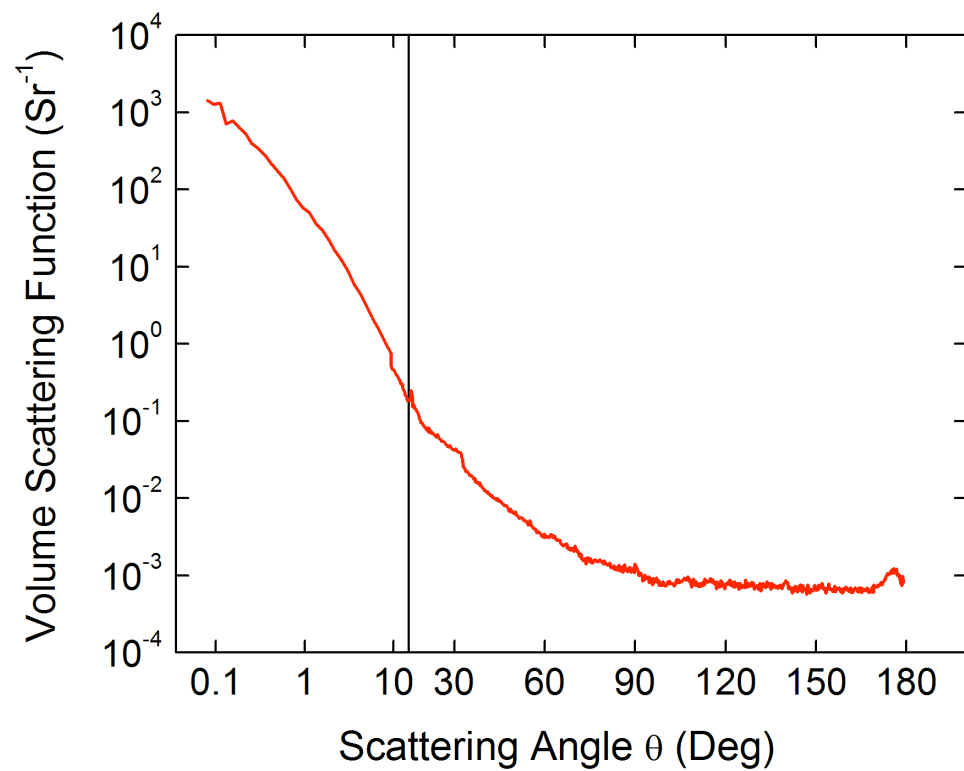
AC9 vs ASD Cast 43 – 20m (PRF2010291_38_corr.dat) CTD 16



TSS



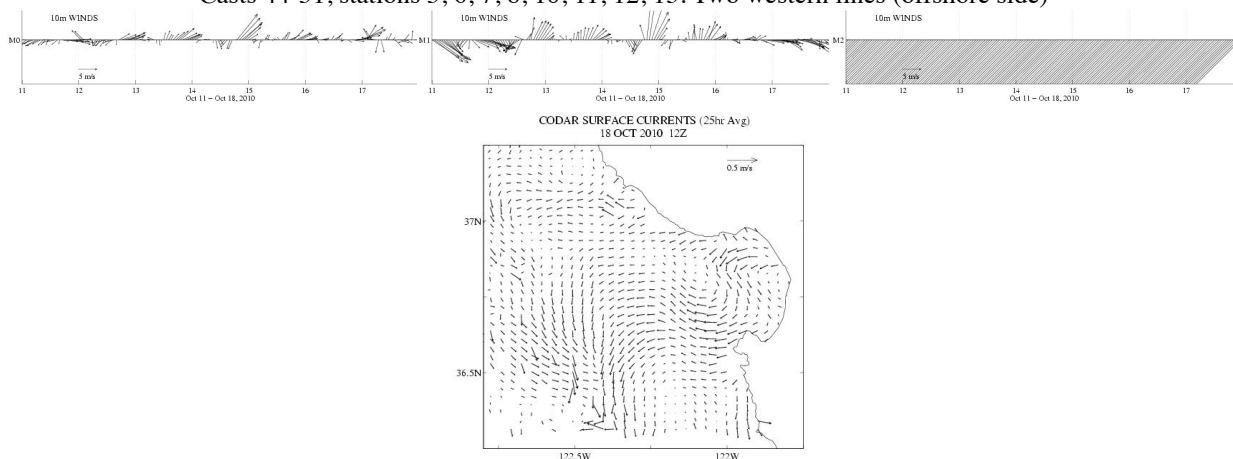
MVSM



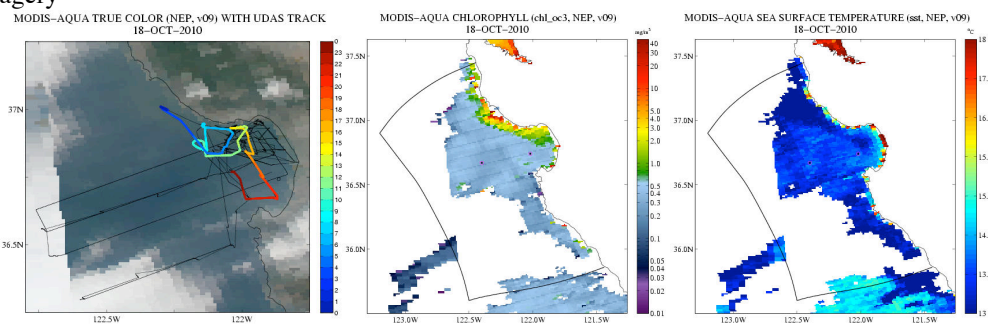
10/18

(upwelling weakening) Bloom barely visible at MB surface (satellite images)

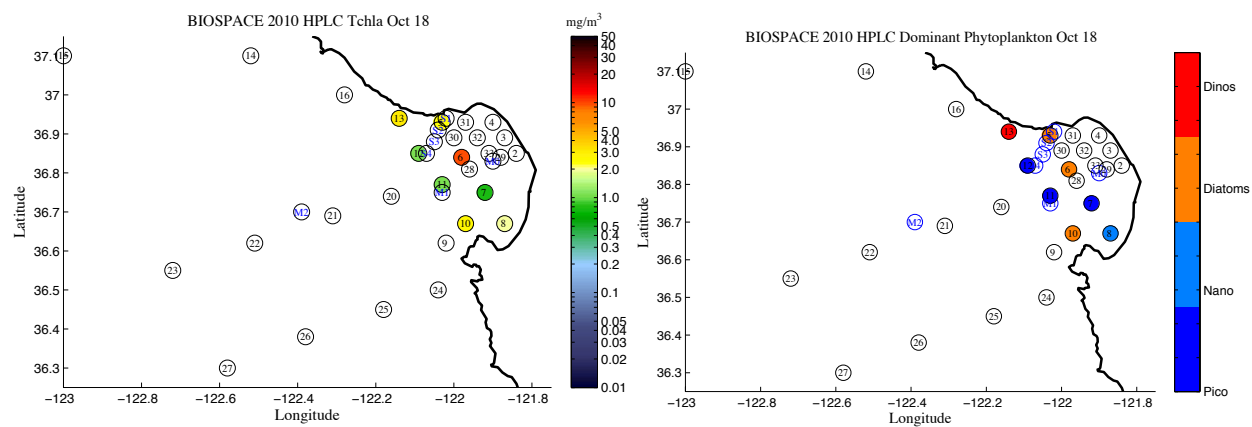
Casts 44-51, stations 5, 6, 7, 8, 10, 11, 12, 13. Two western lines (offshore side)



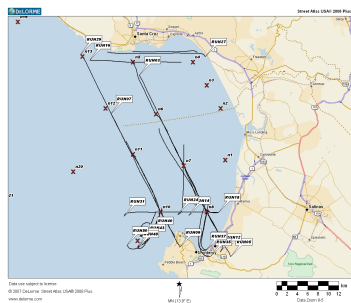
Satellite Imagery



HPLC



Aircraft Flight-lines

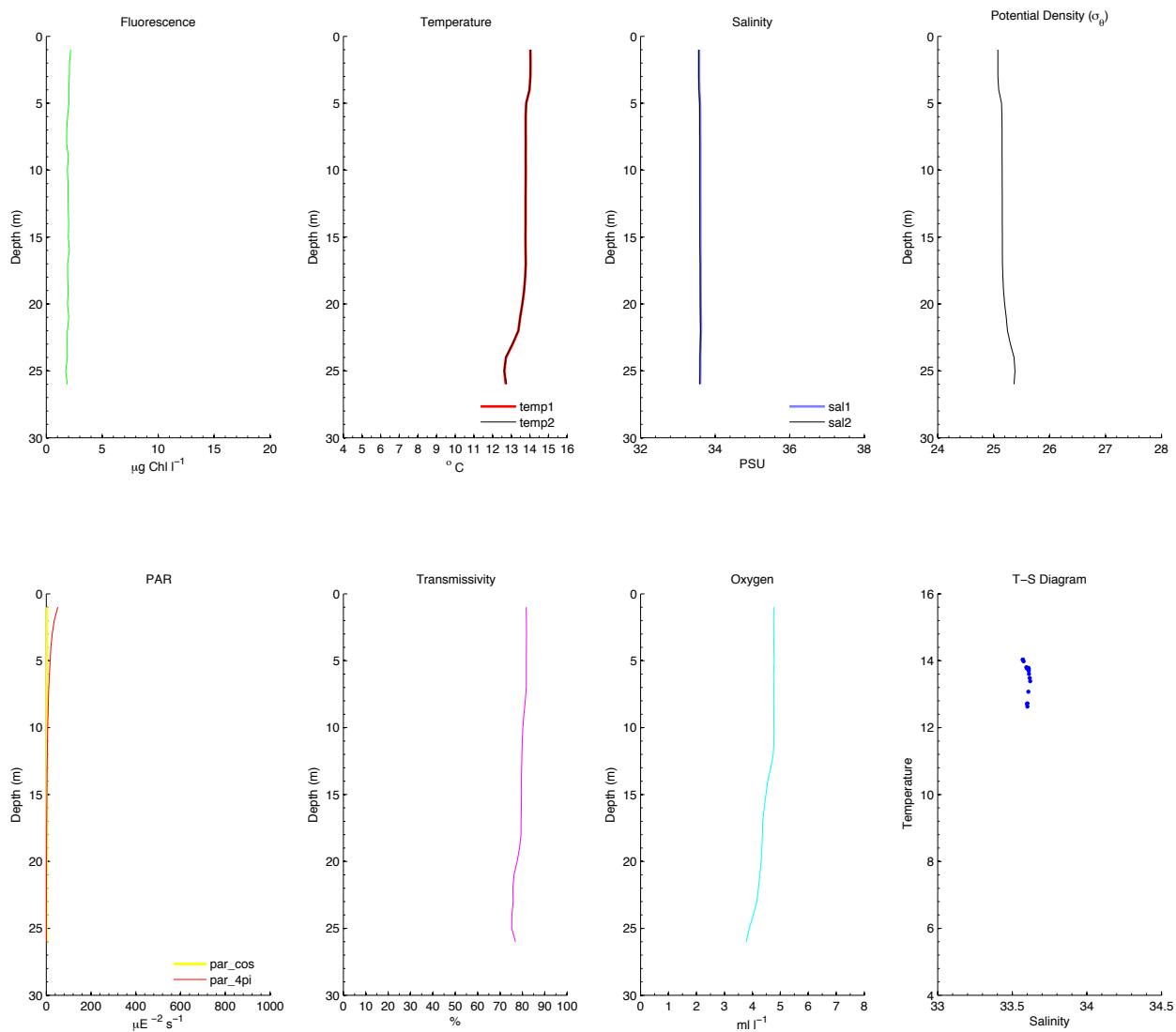


PHILLS Caption: Beautiful day. Sky clear over much of Bay. North Bay covered by Marine layer at beginning of flight but cleared by mid-flight. Marine layer largely not present. Flight initially at 10000 feet, but dropped to 5000 feet early on. NRL ship PT Sur seen at CTD stations 6, 7 and 10. Short flights over ship accomplished in both sweeping and tracking mode. Another run over airport at end of day. New sweep mode parameters used to get wider swath width. Run over Lagunna Secca not taken with PHILLS.

Cast 44 (0800 PDT; [Station BS05](#))
(fluorescence profile -flat) (partly cloudy)

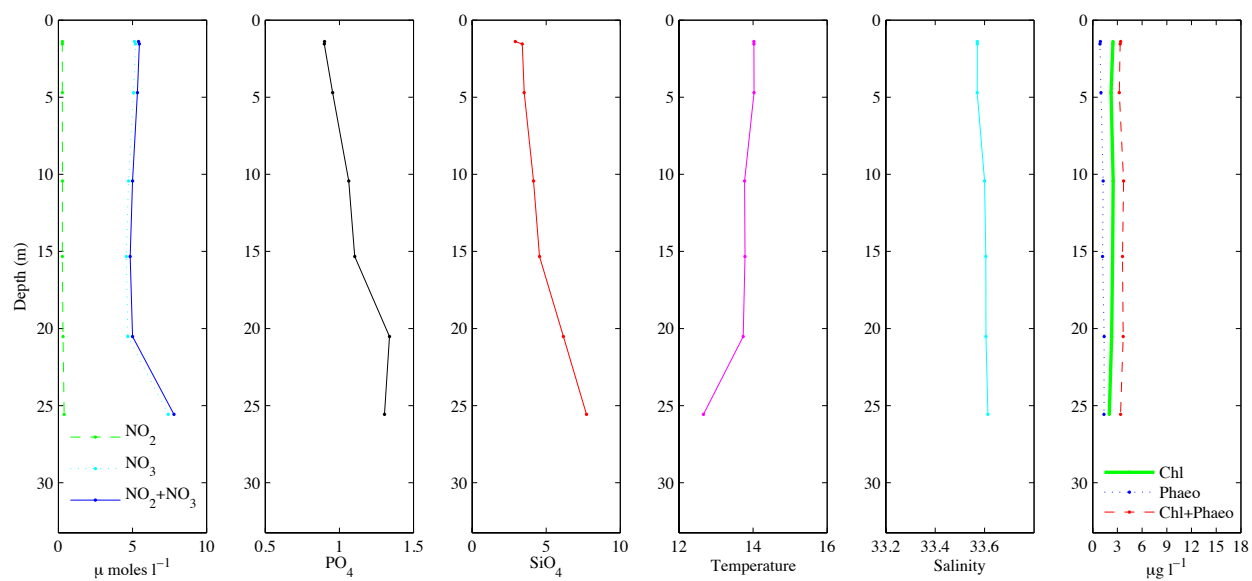
CTD

BIOSPACE 2010 Cast 44 (CTD05; 2010-10-18 15:03:00.000 UTC) CTD Downcast Data (Calibrated)



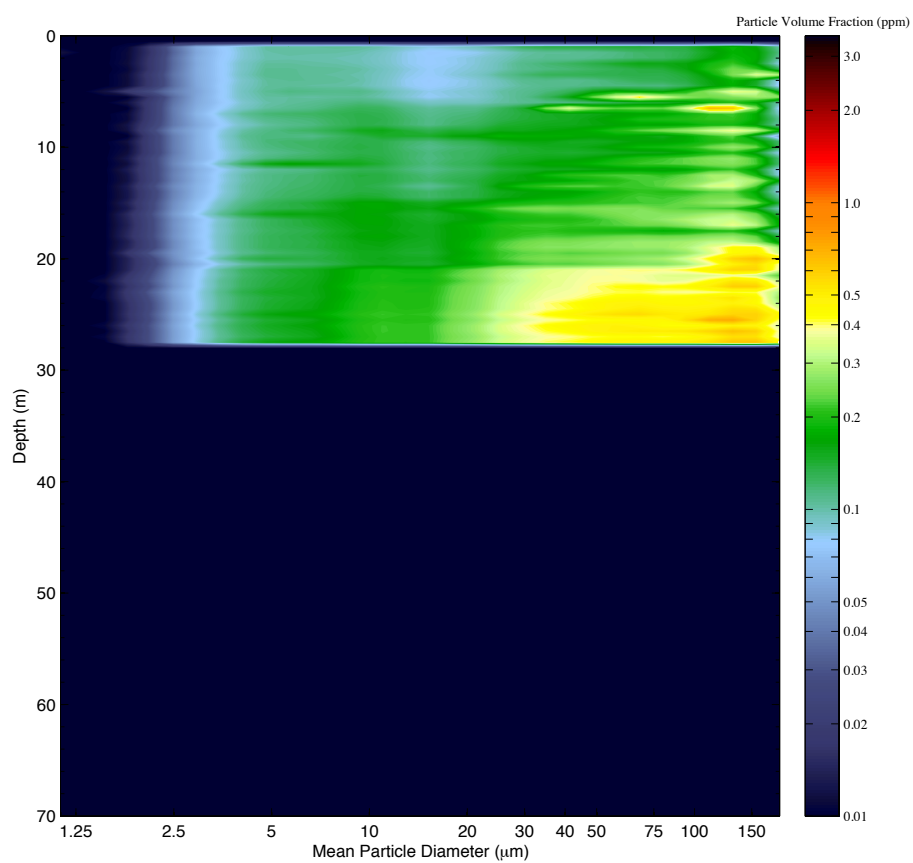
Bottle Nutrients and Chlorophyll

BIOSPACE 2010 Cast 44

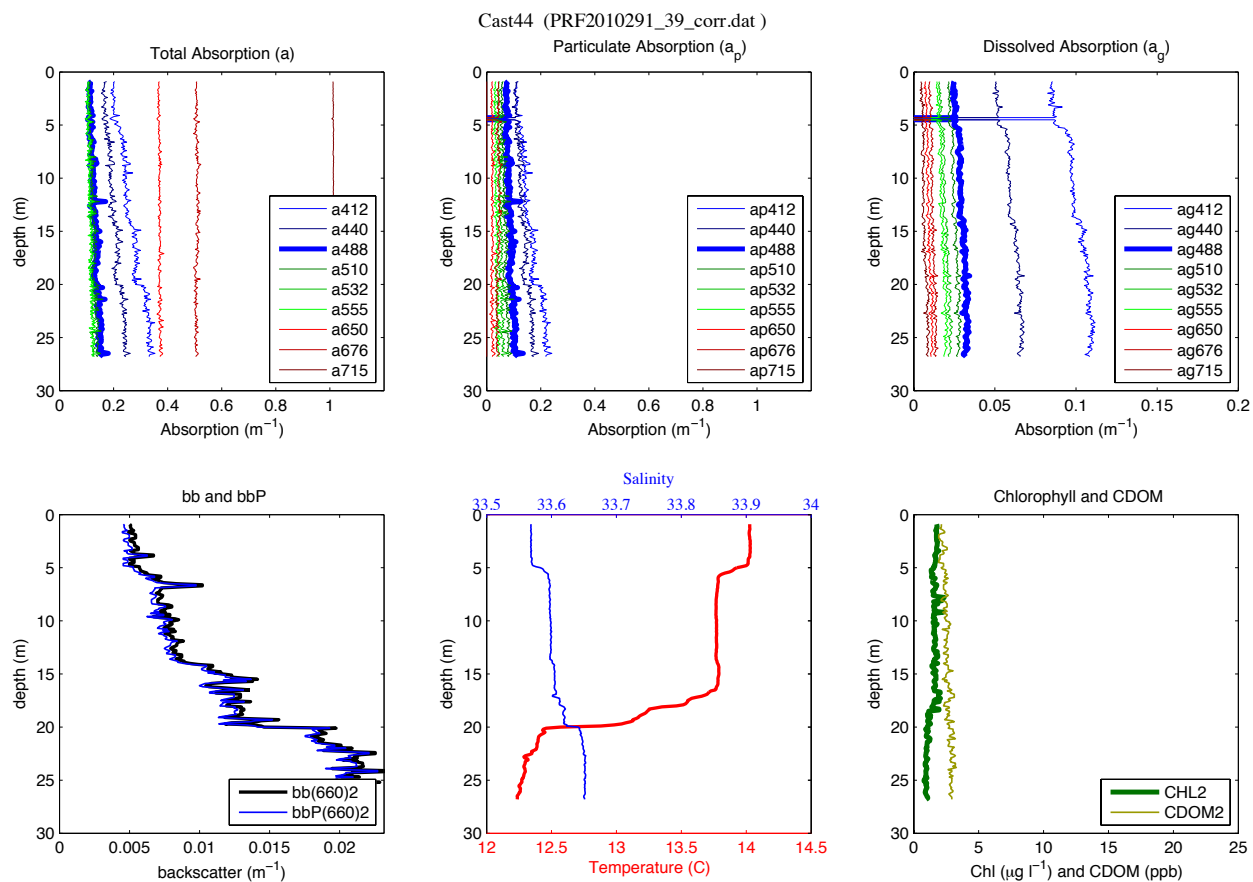


LISST

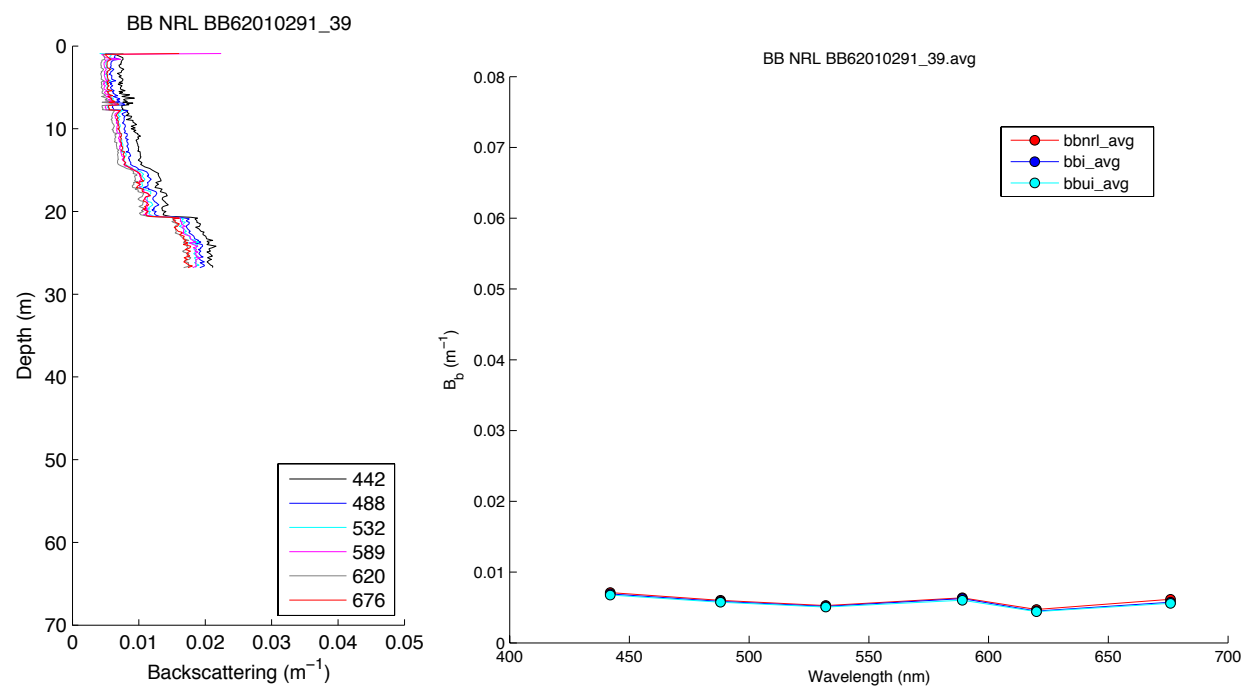
LISST – Cast 44



Optics Profile Package

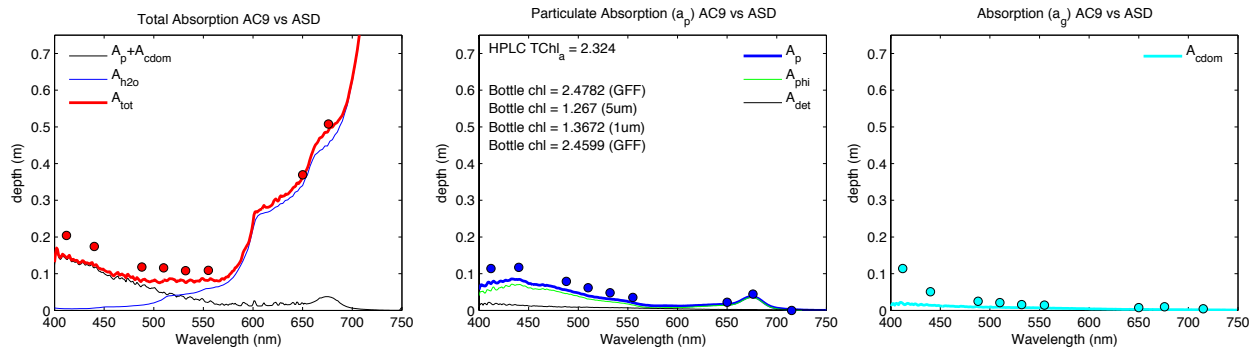


HydroScat

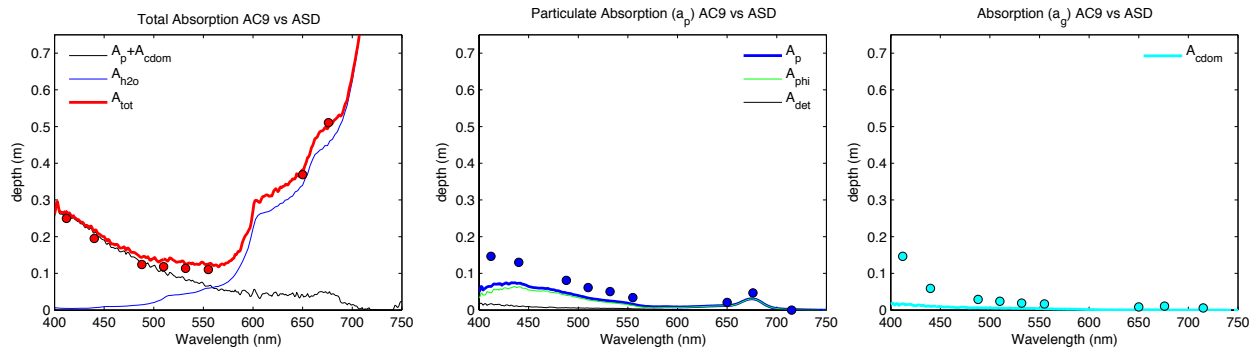


Filter Pad Absorption (w/ AC9)

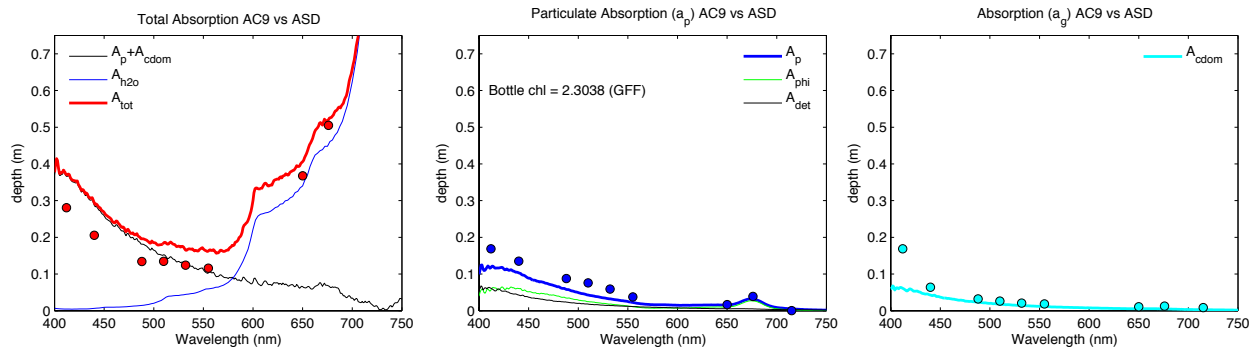
AC9 vs ASD Cast 44 – 0m (PRF2010291_39_corr.dat) CTD 16



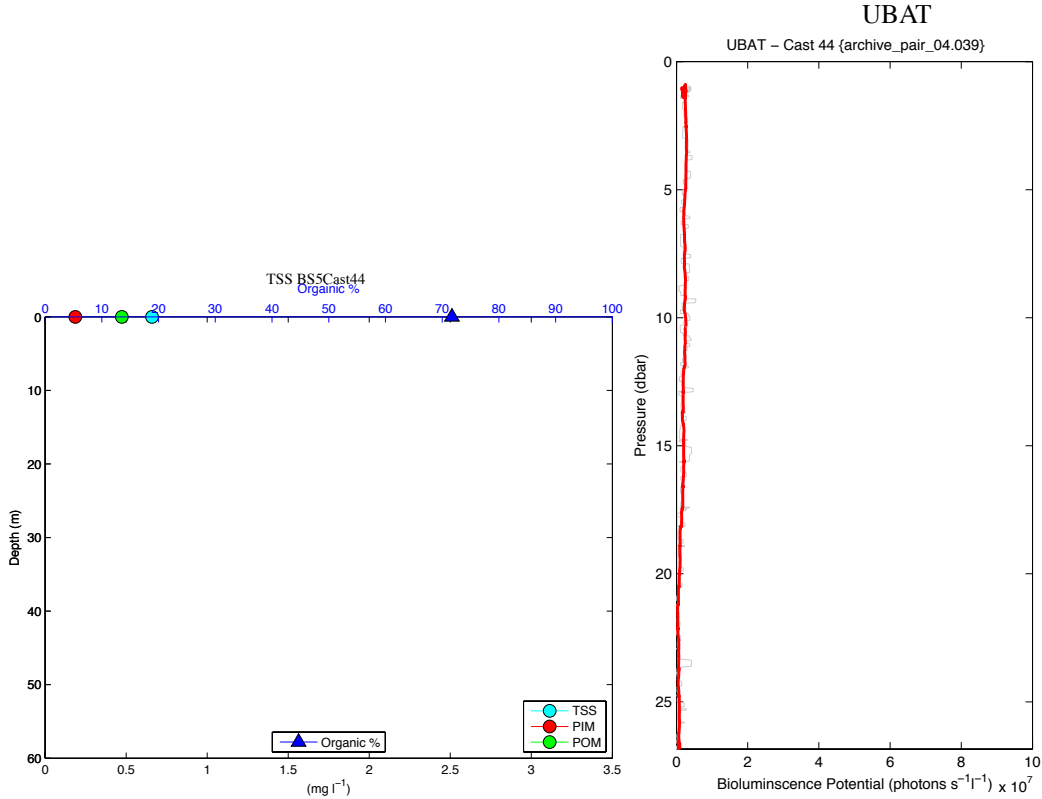
AC9 vs ASD Cast 44 – 11m (PRF2010291_39_corr.dat) CTD 16



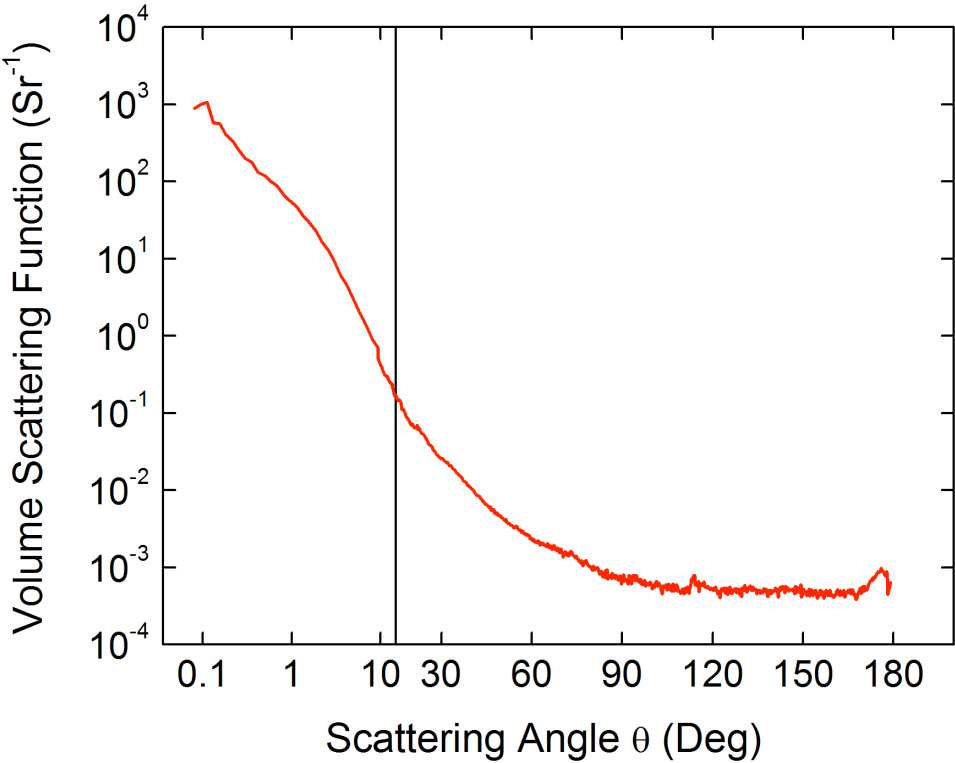
AC9 vs ASD Cast 44 – 20m (PRF2010291_39_corr.dat) CTD 16



TSS



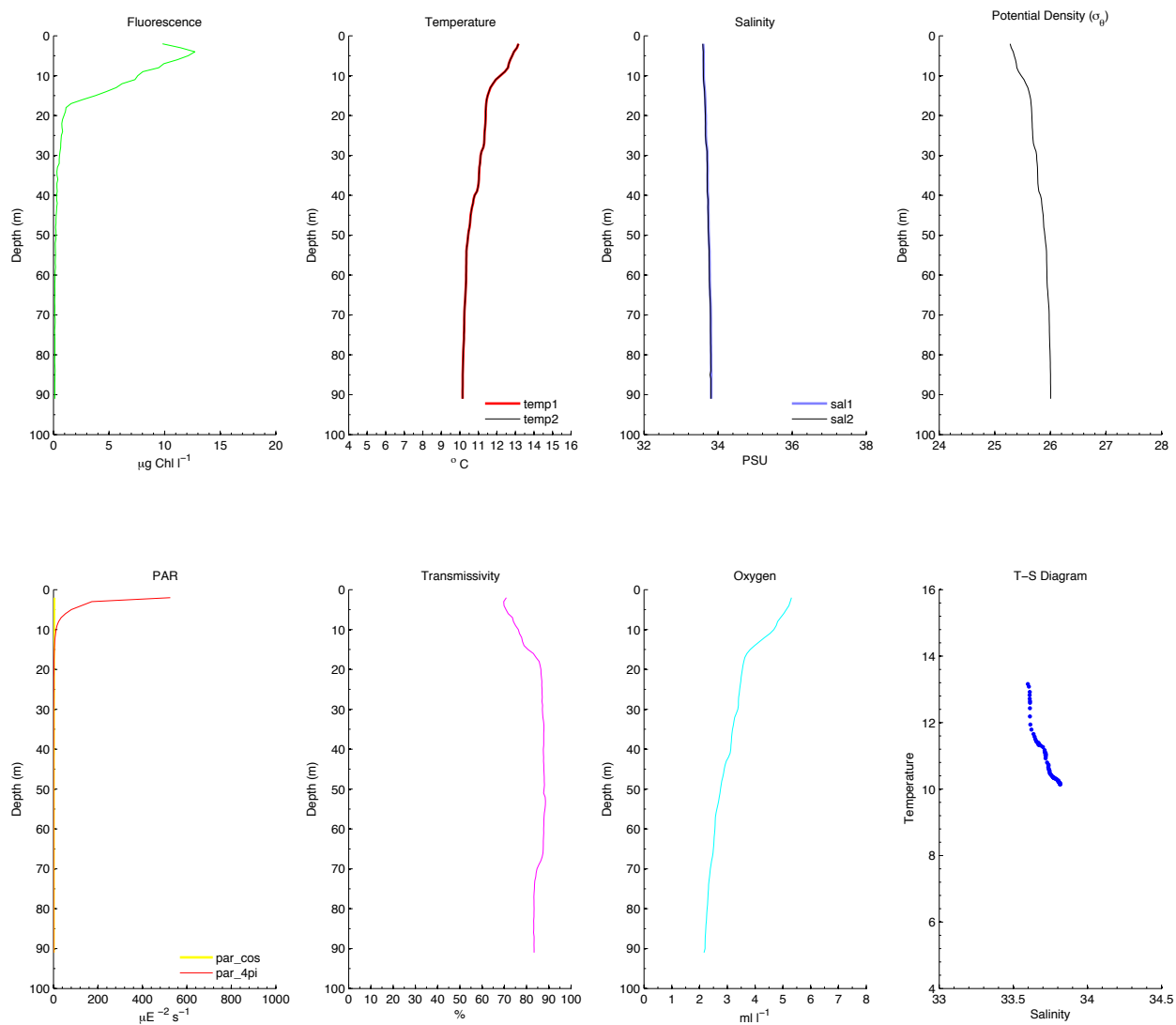
MVSM



Cast 45 (0940 PDT; [Station BS06](#))
(partly cloudy)

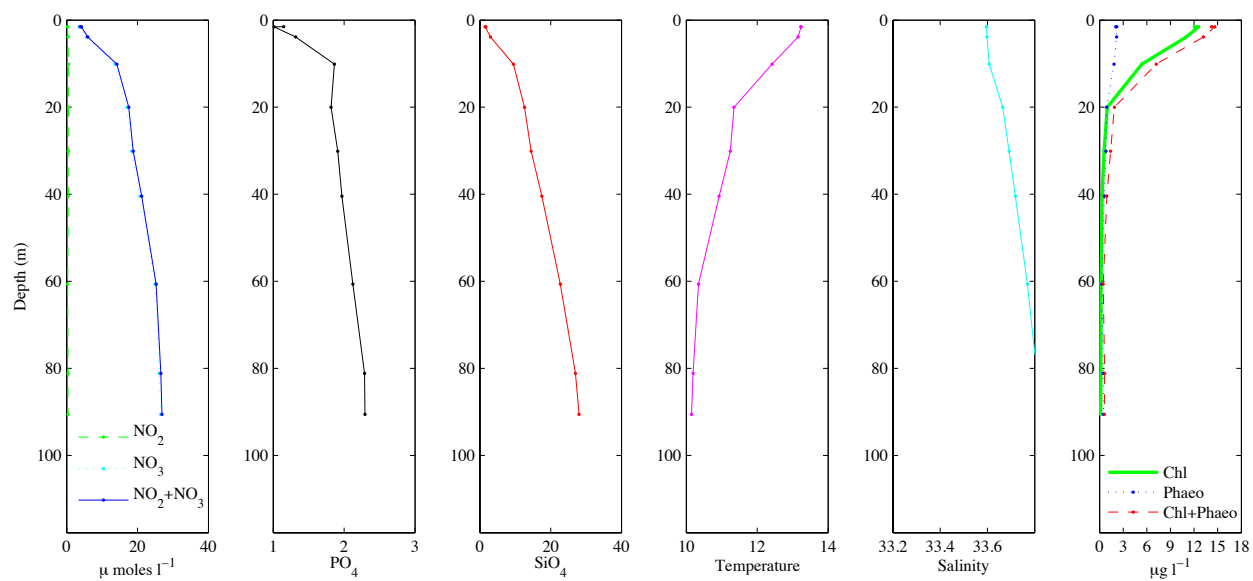
CTD

BIOSPACE 2010 Cast 45 (CTD06; 2010-10-18 16:41:00.000 UTC) CTD Downcast Data (Calibrated)



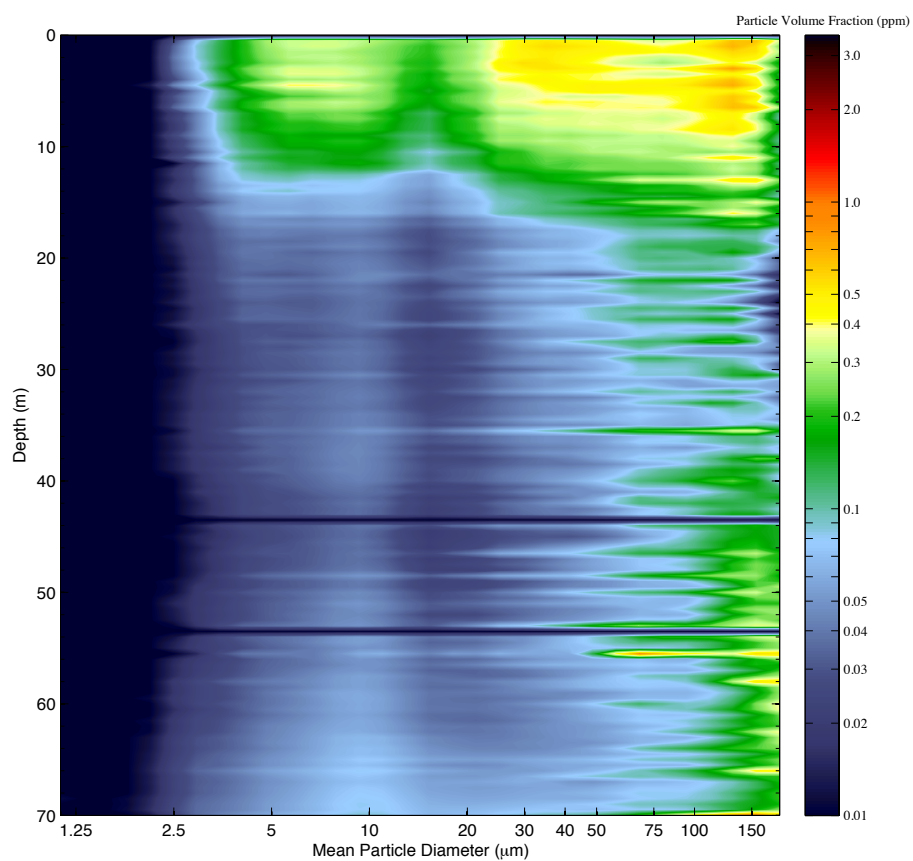
Bottle Nutrients and Chlorophyll

BIOSPACE 2010 Cast 45

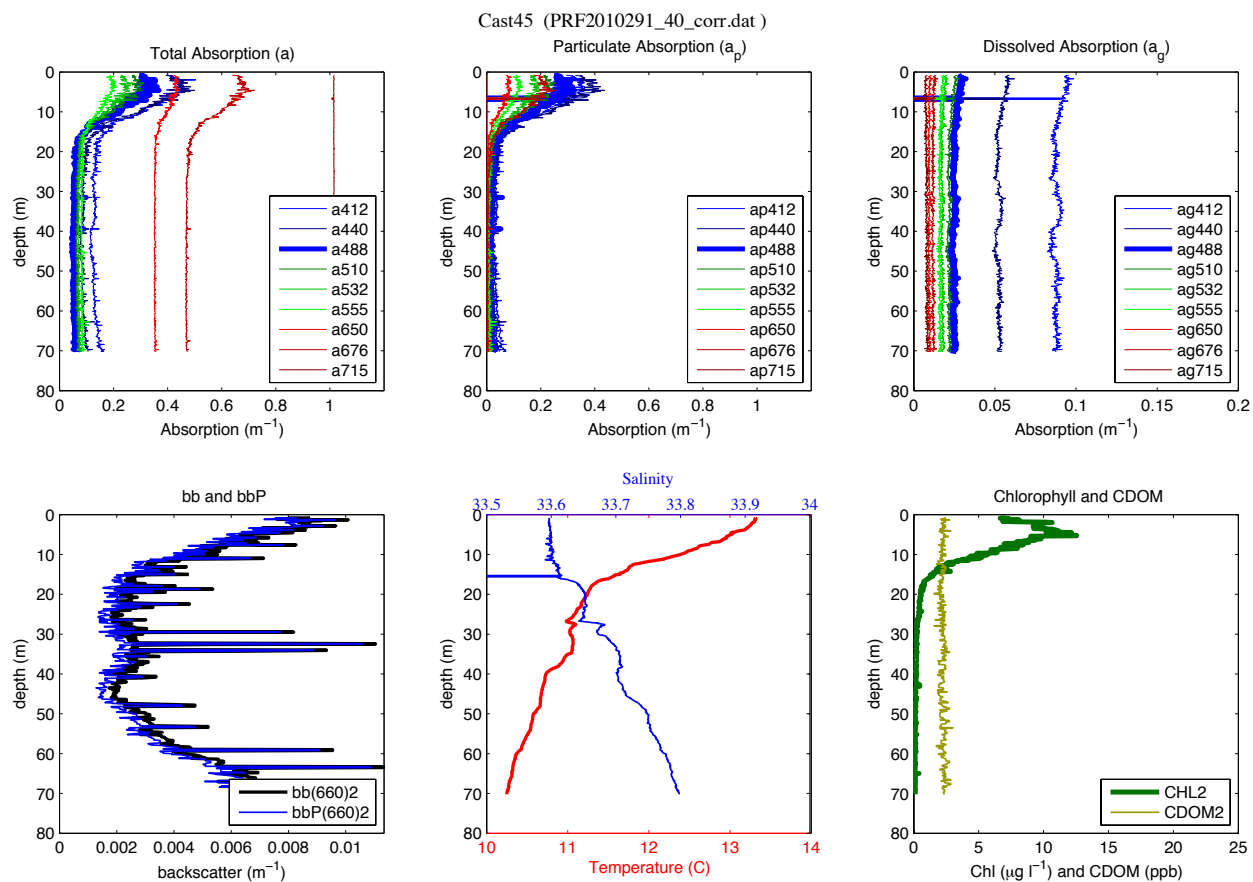


LISST

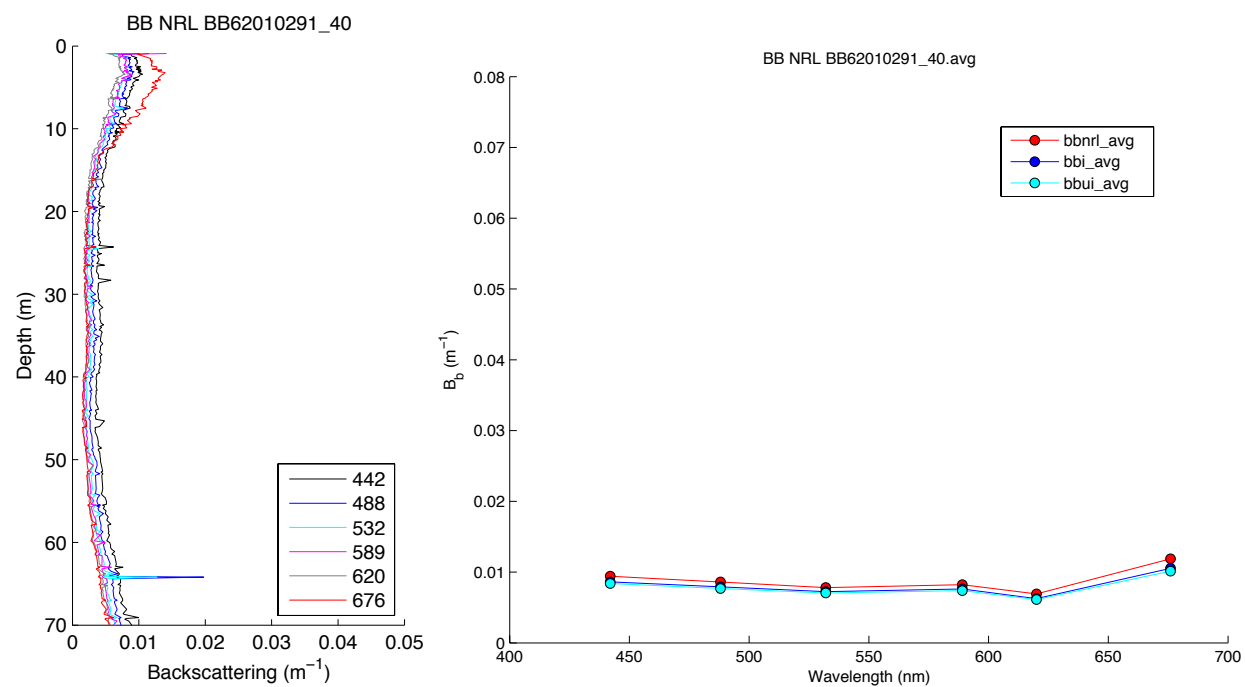
LISST – Cast 45



Optics Profile Package

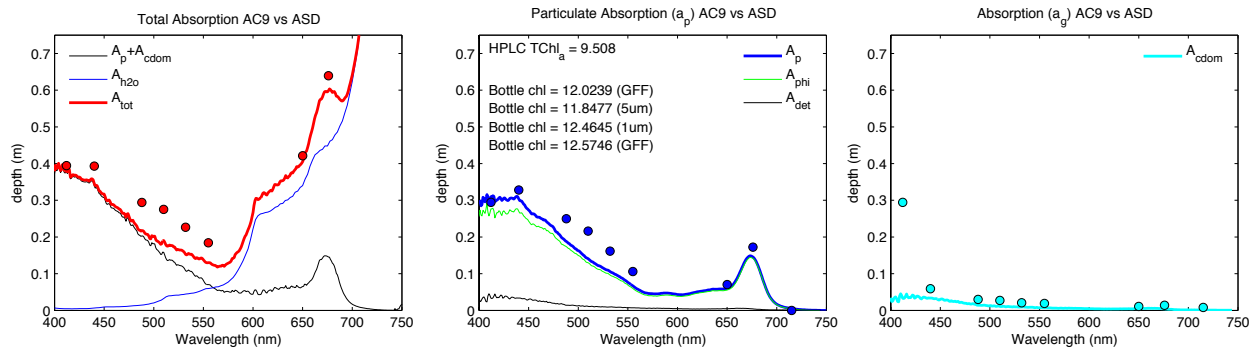


HydroScat

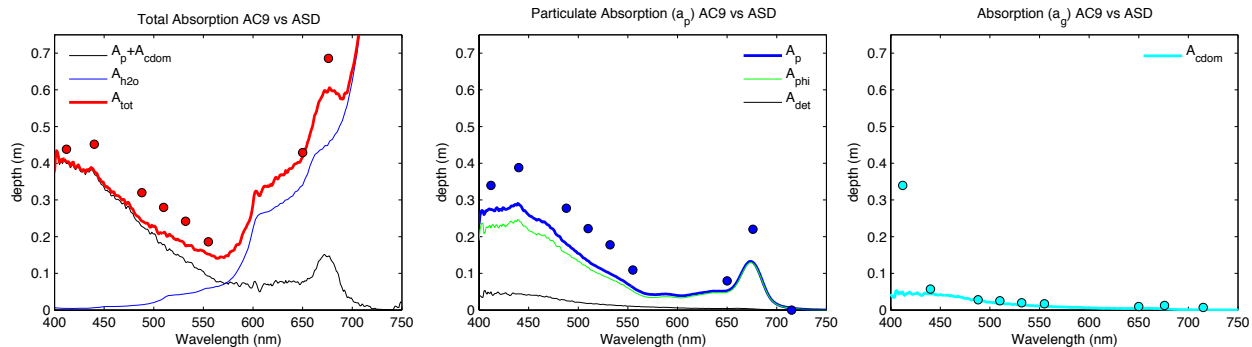


Filter Pad Absorption (w/ AC9)

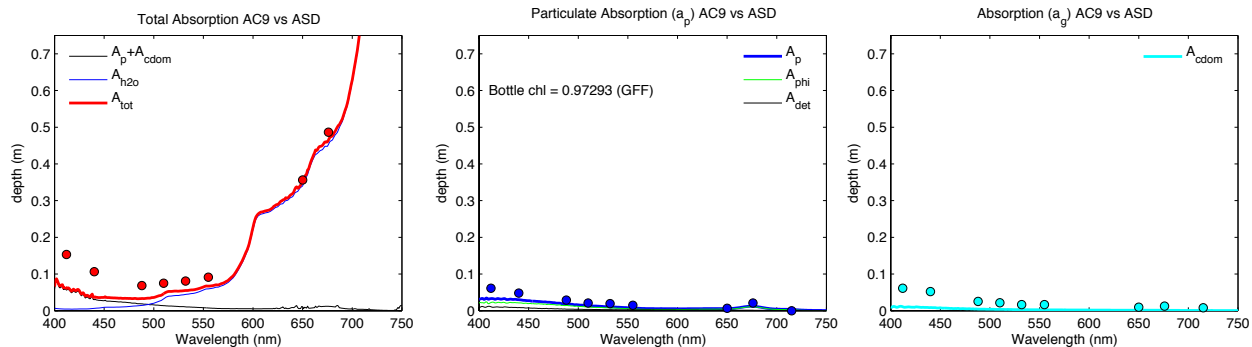
AC9 vs ASD Cast 45 – 0m (PRF2010291_40_corr.dat) CTD 16



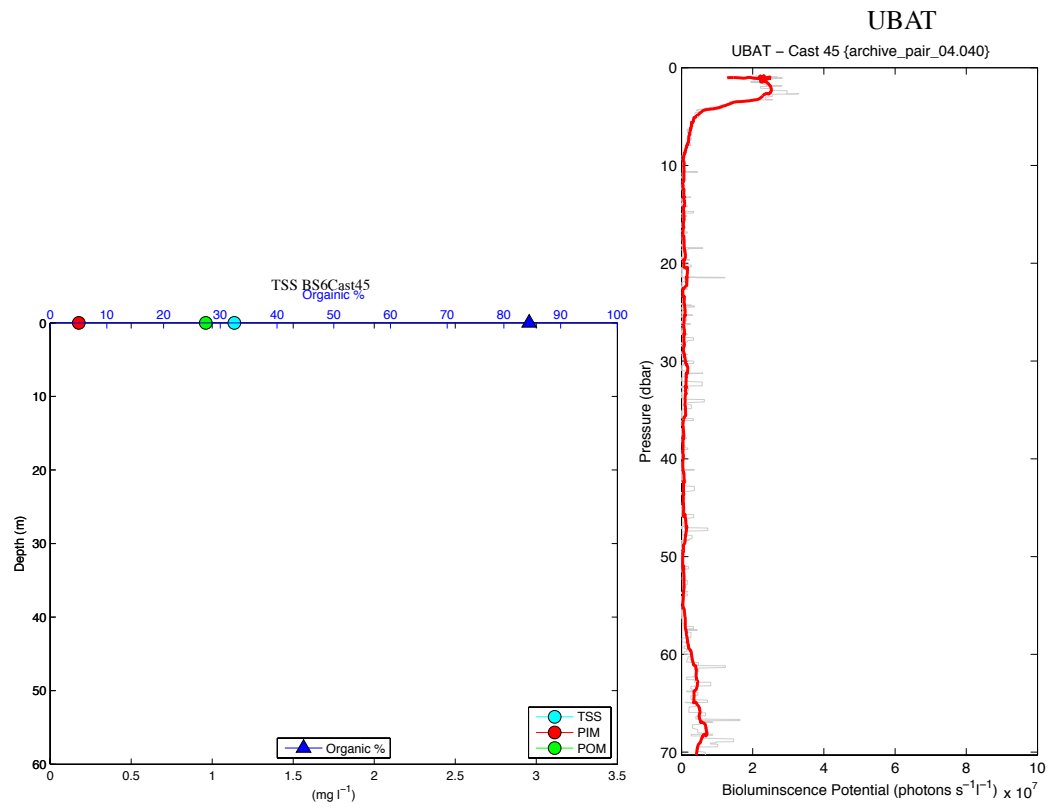
AC9 vs ASD Cast 45 – 5m (PRF2010291_40_corr.dat) CTD 16



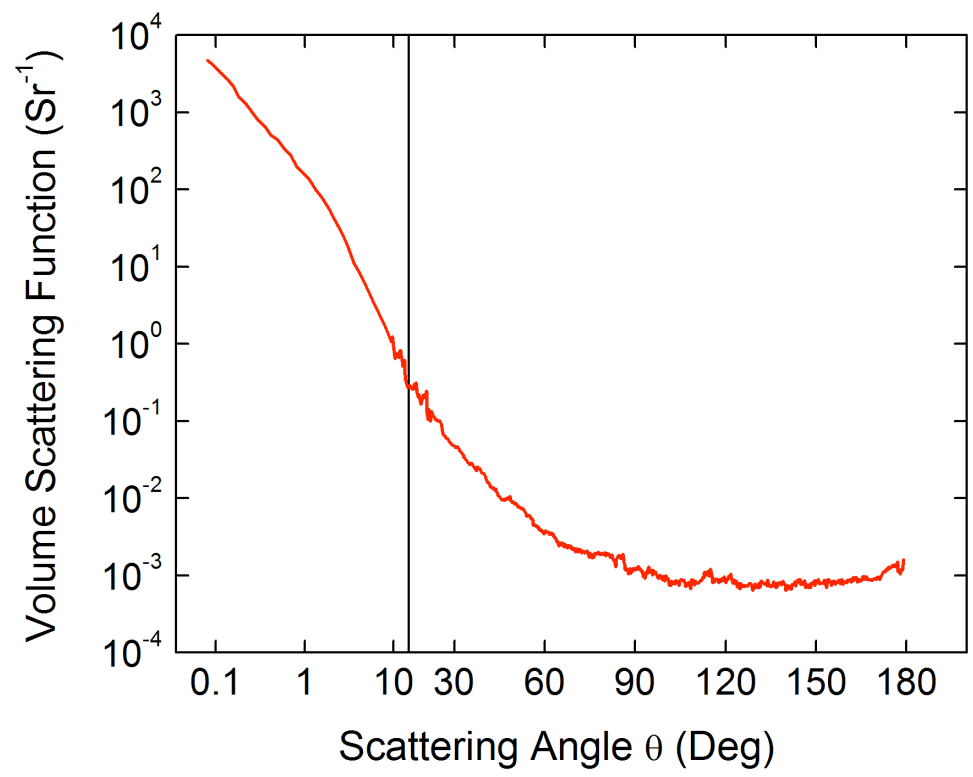
AC9 vs ASD Cast 45 – 20m (PRF2010291_40_corr.dat) CTD 16



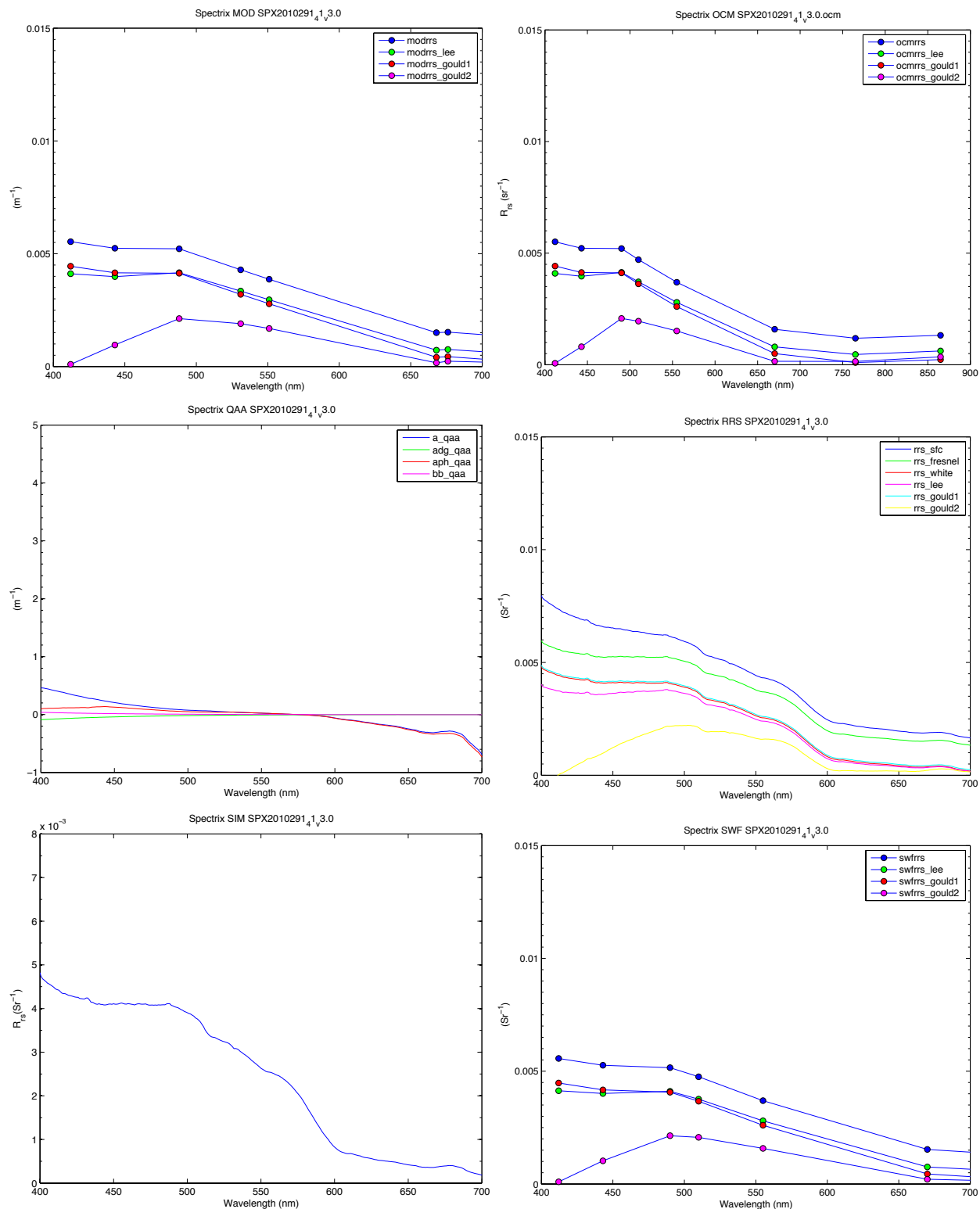
TSS

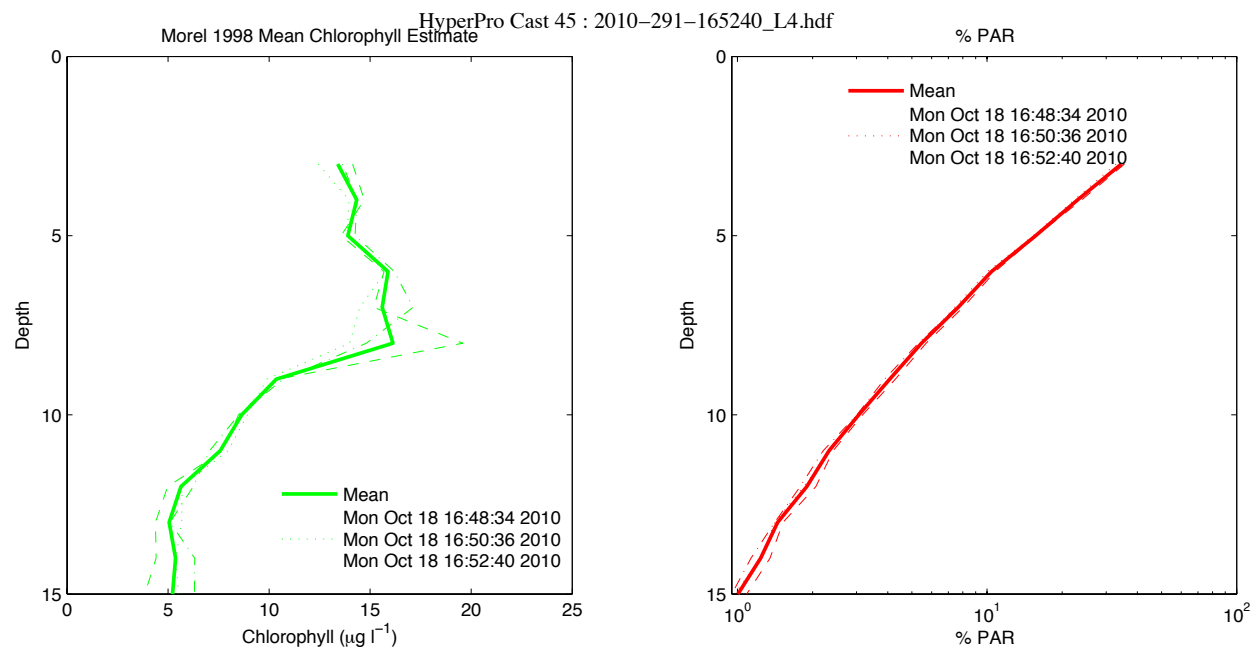


MVSM



SPECTRIX

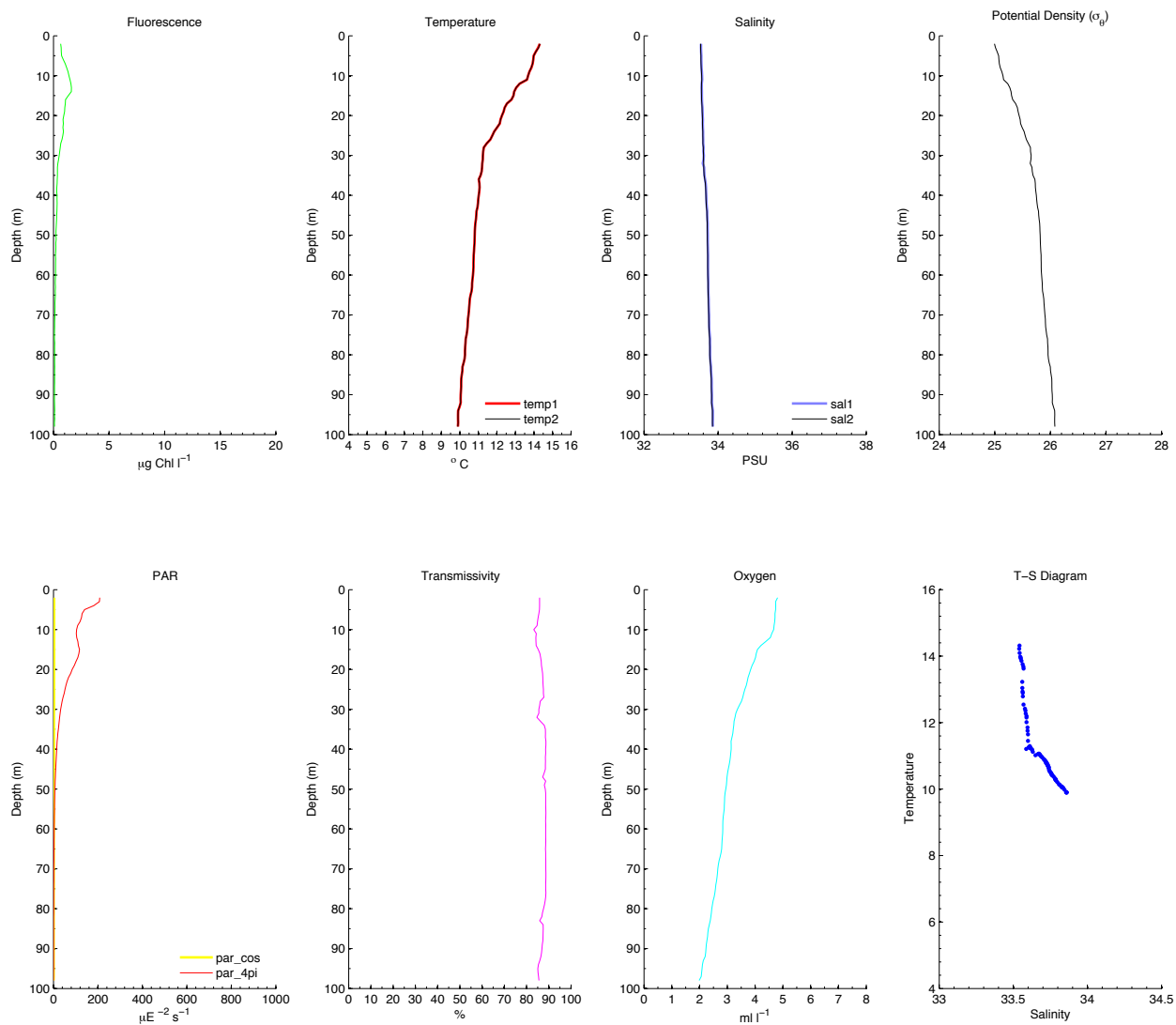




Cast 46 (1151 PDT; [Station BS07](#))
(mostly sunny)

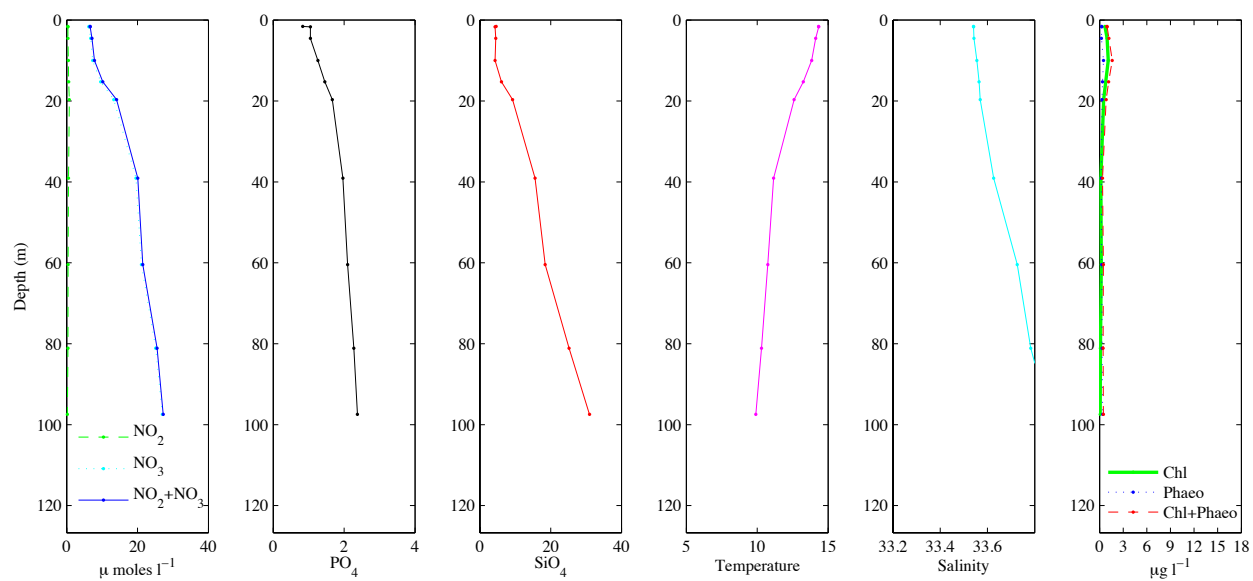
CTD

BIOSPACE 2010 Cast 46 (CTD07; 2010-10-18 18:51:00.000 UTC) CTD Downcast Data (Calibrated)



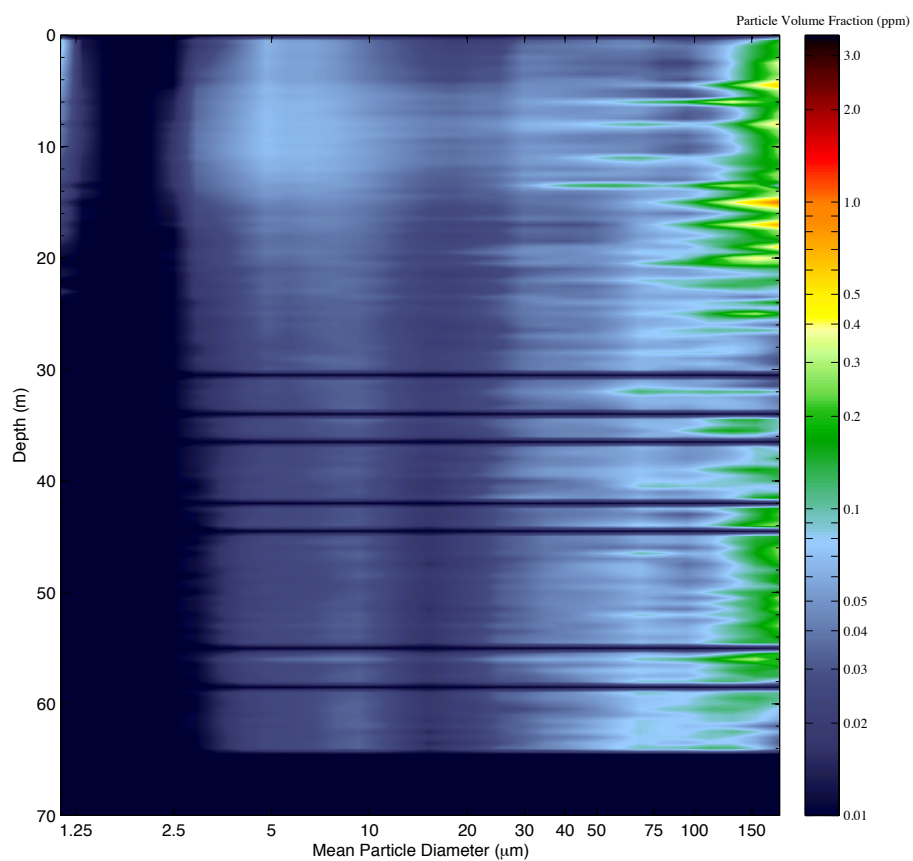
Bottle Nutrients and Chlorophyll

BIOSPACE 2010 Cast 46

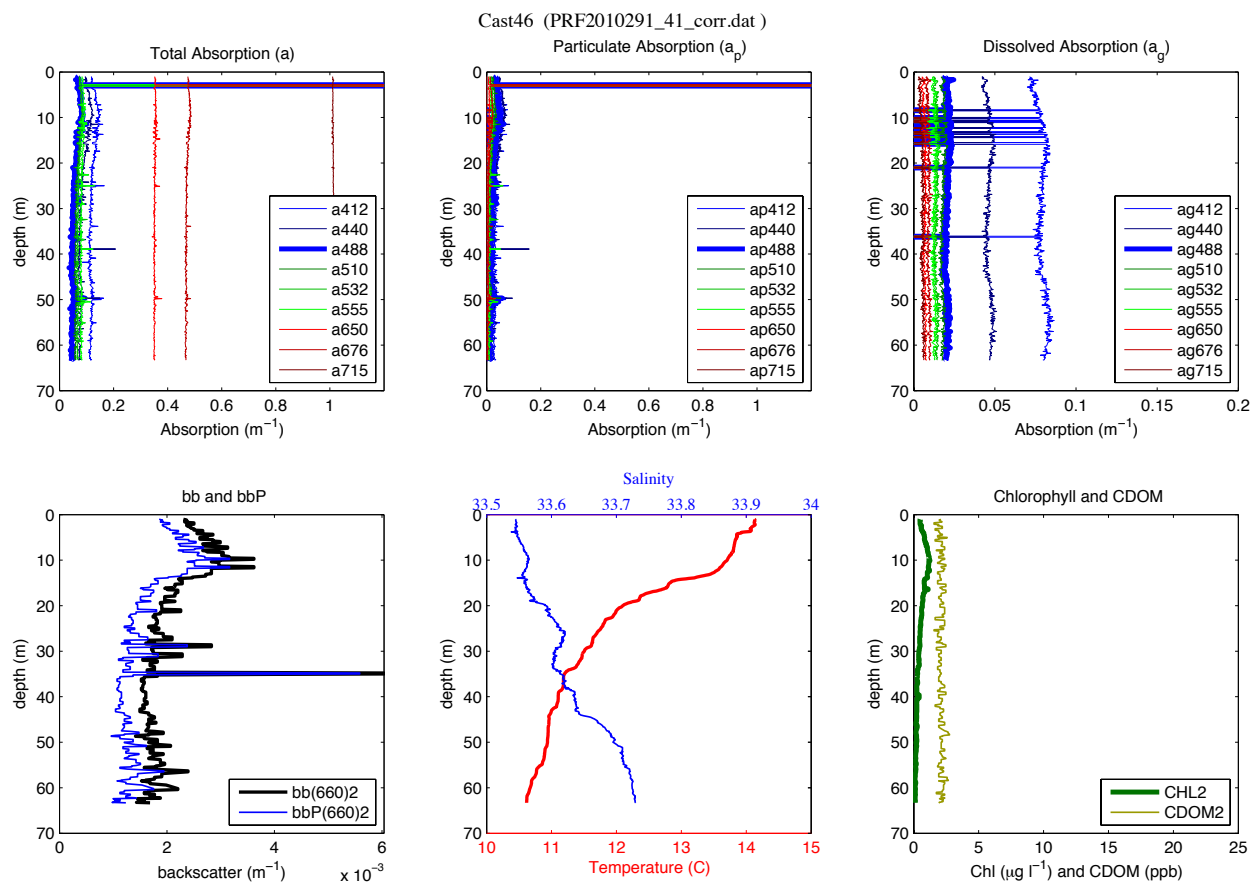


LISST

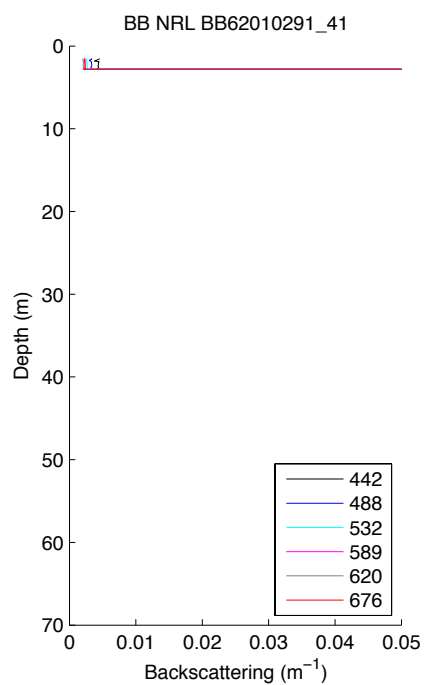
LISST – Cast 46



Optics Profile Package

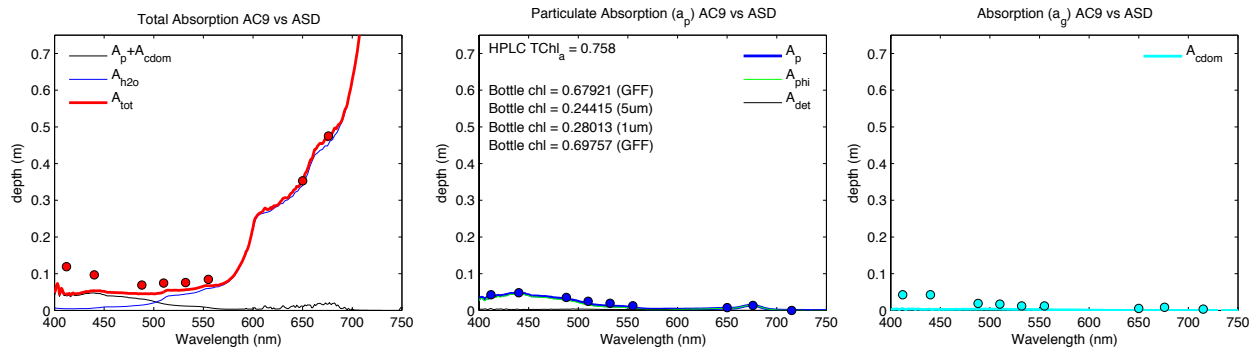


HydroScat

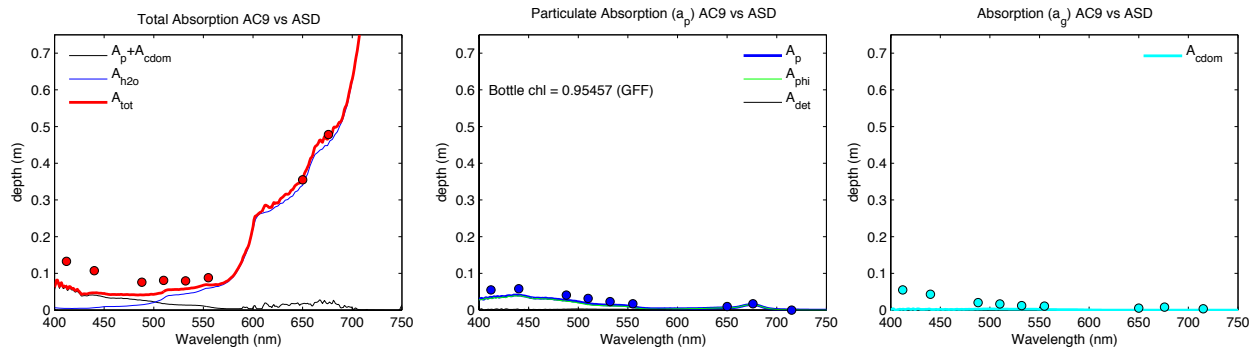


Filter Pad Absorption (w/ AC9)

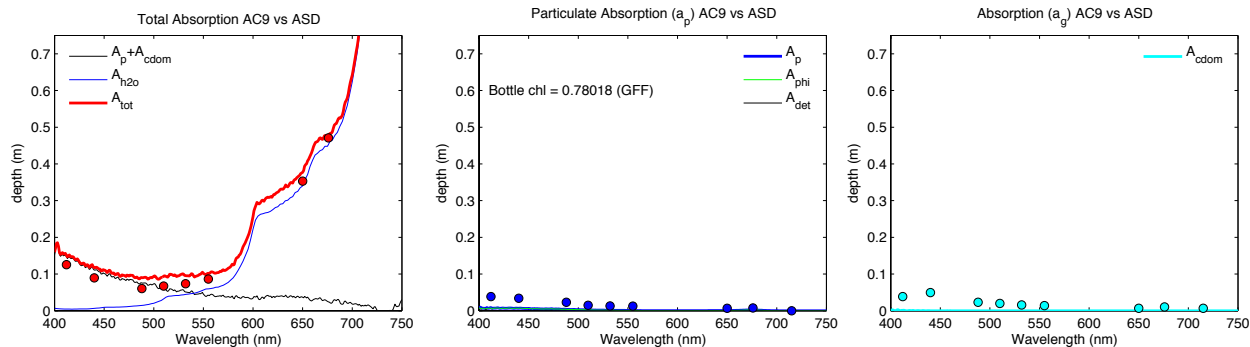
AC9 vs ASD Cast 46 – 0m (PRF2010291_41_corr.dat) CTD 05



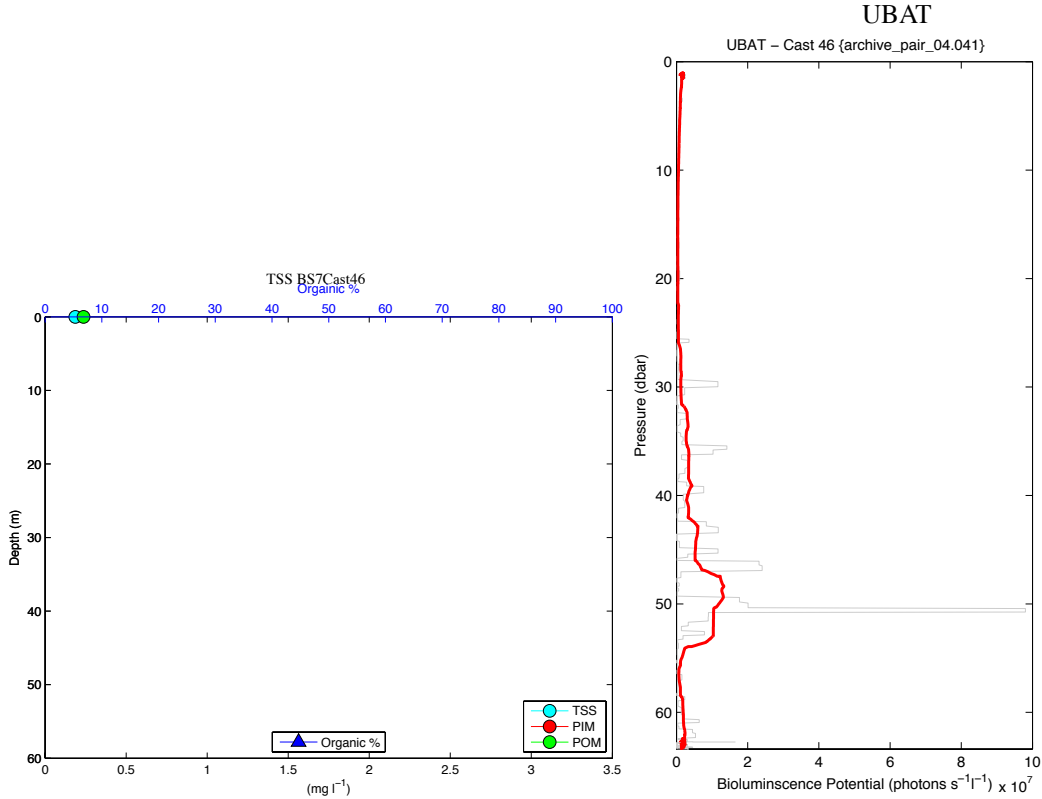
AC9 vs ASD Cast 46 – 4m (PRF2010291_41_corr.dat) CTD 05



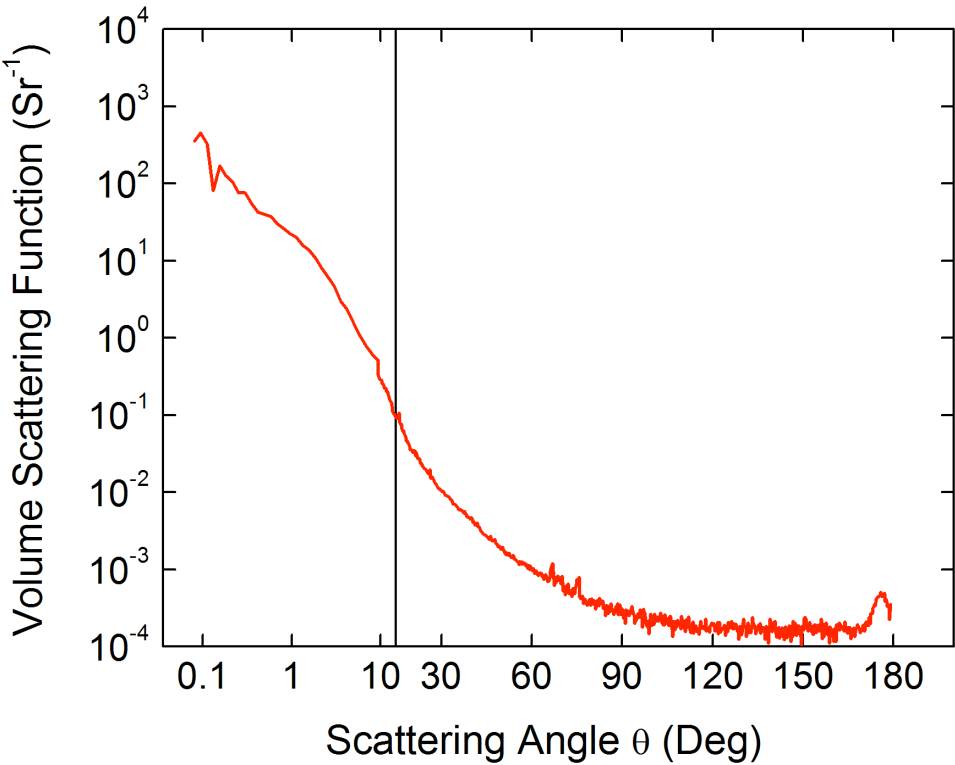
AC9 vs ASD Cast 46 – 20m (PRF2010291_41_corr.dat) CTD 05



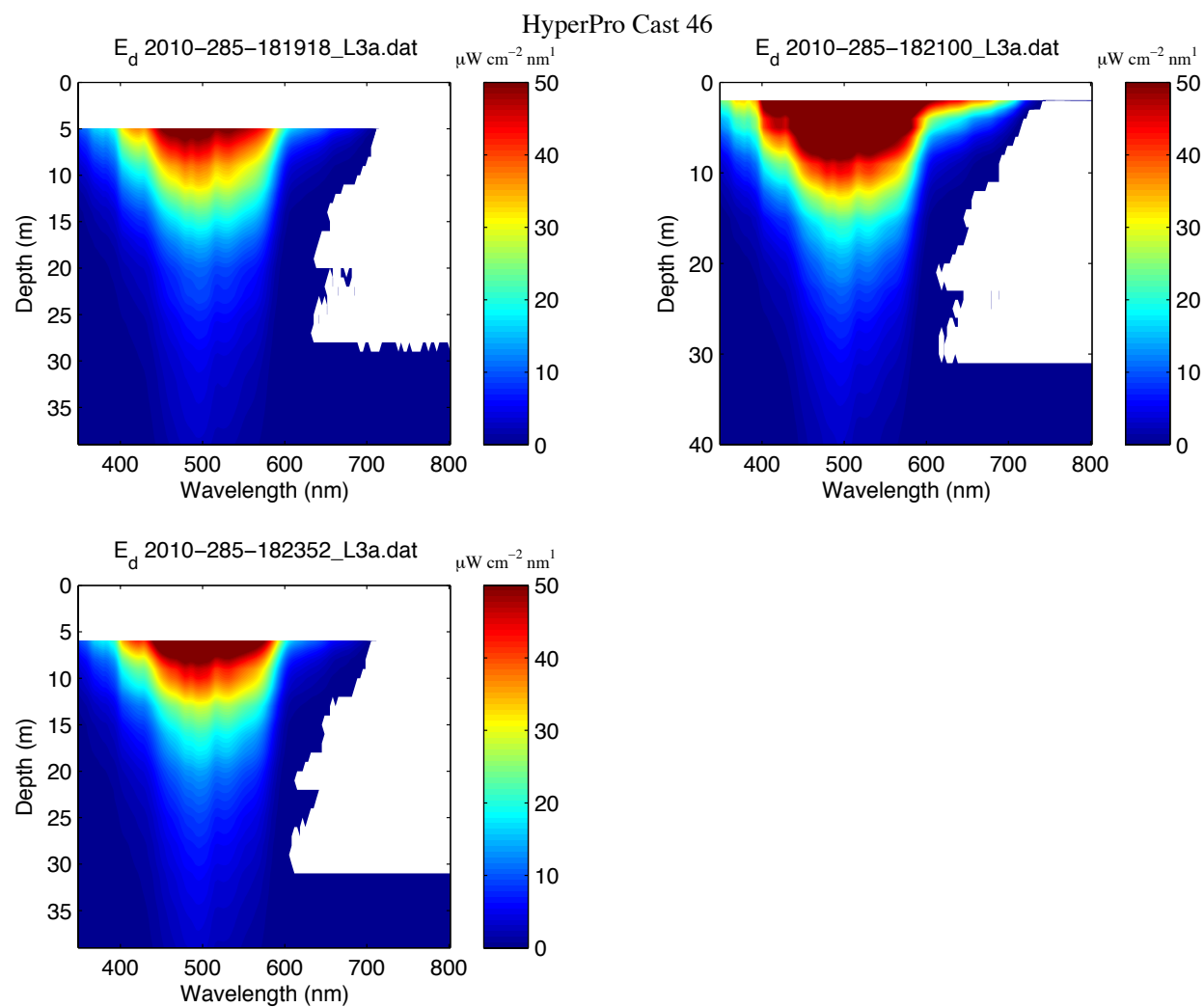
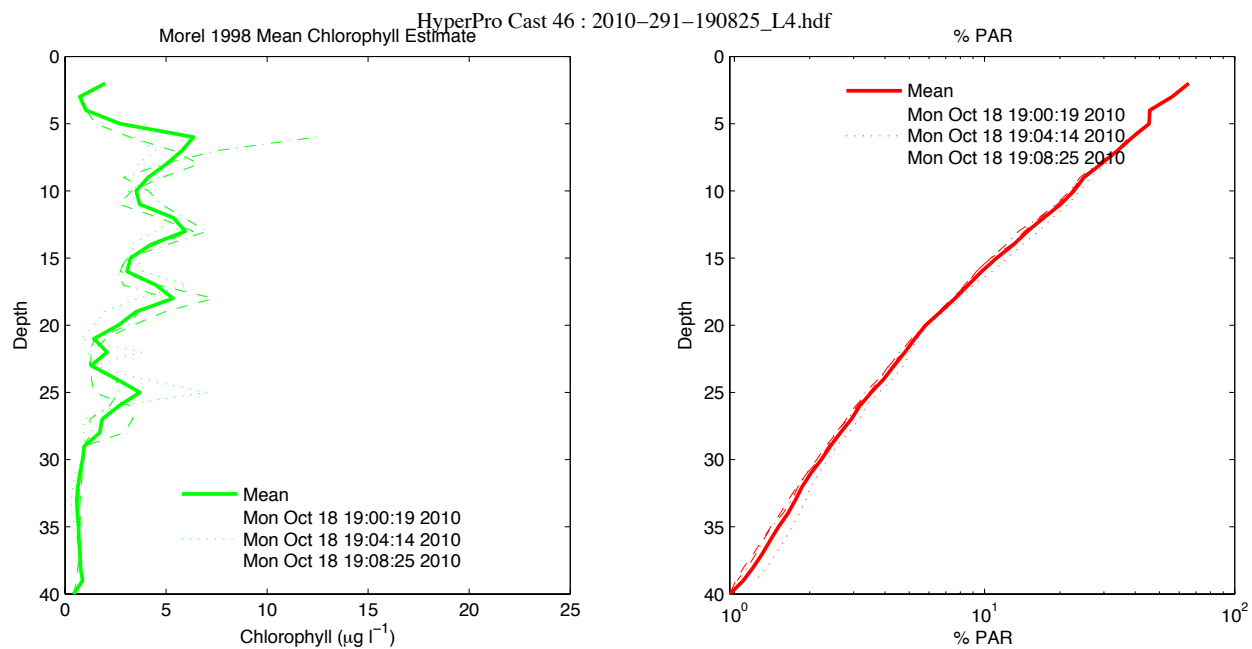
TSS



MVSM



HyperPro

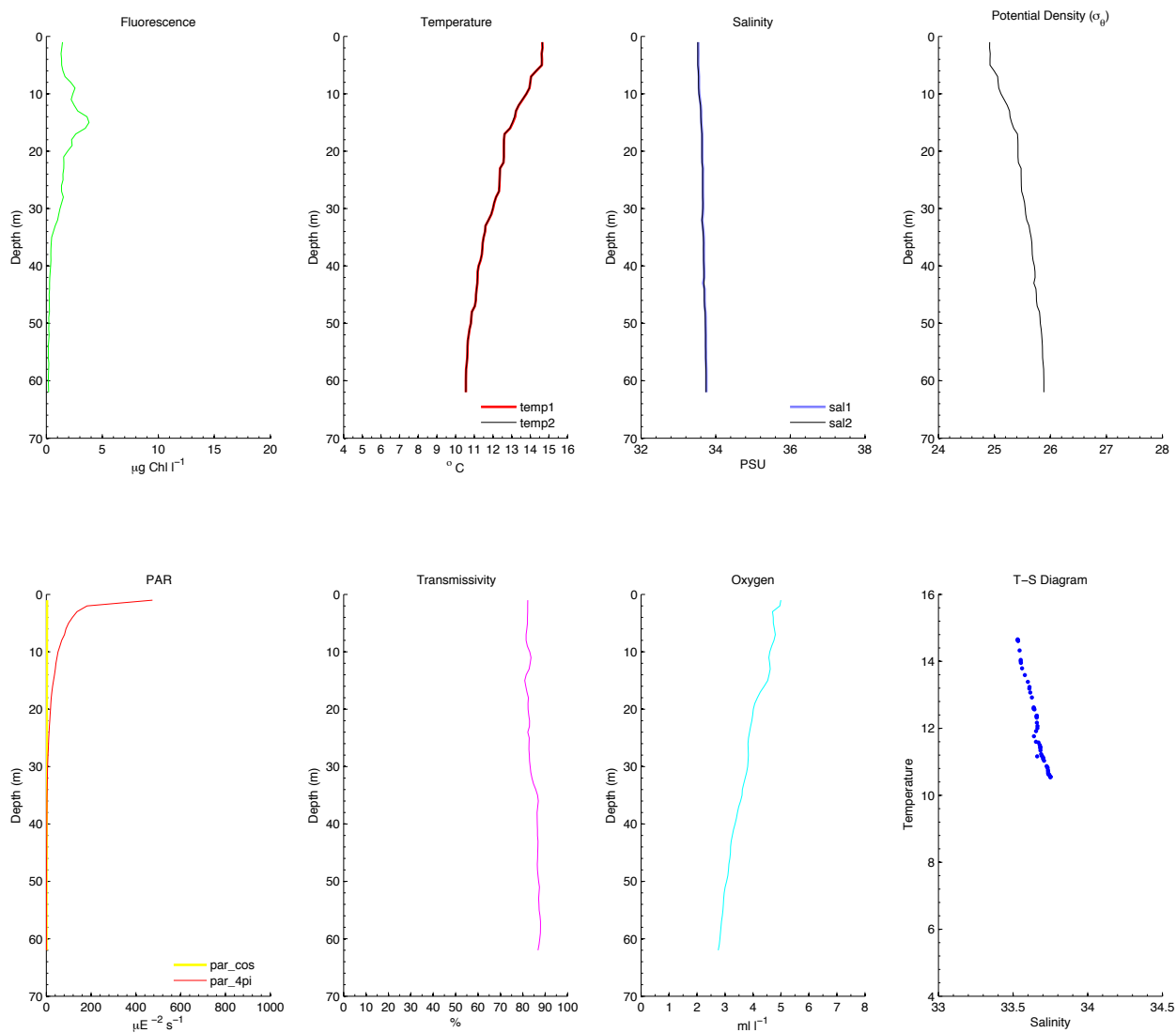


Cast 47 (1343 PDT; [Station BS08](#))

(sharp layer on fluorometer @ 15 m) (clear, some haze)

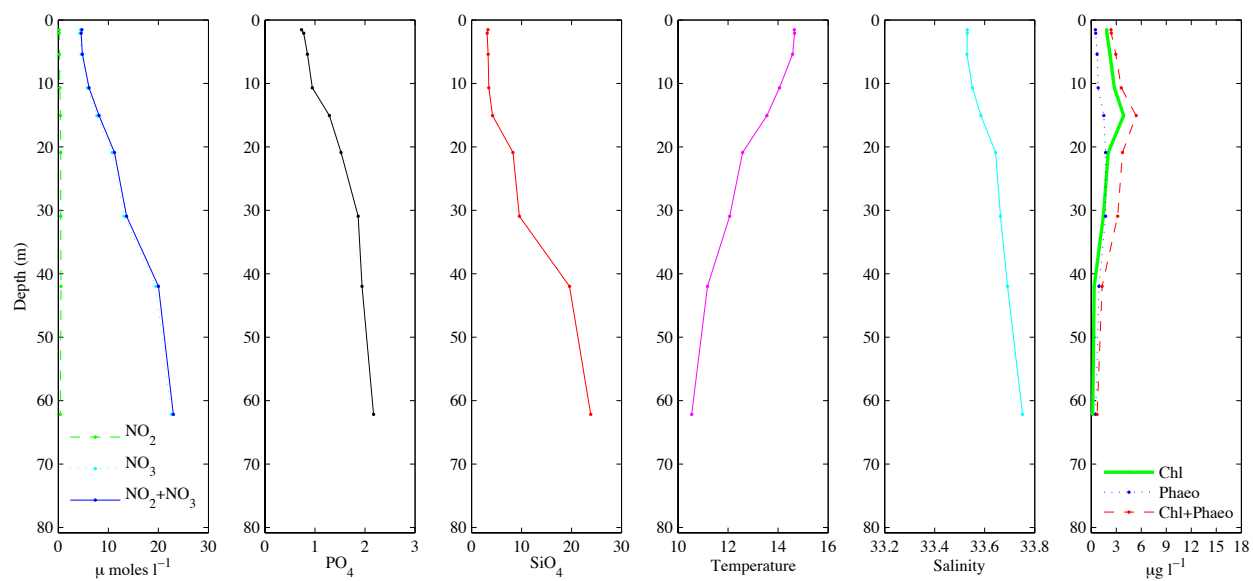
CTD

BIOSPACE 2010 Cast 47 (CTD08; 2010-10-18 20:44:00.000 UTC) CTD Downcast Data (Calibrated)



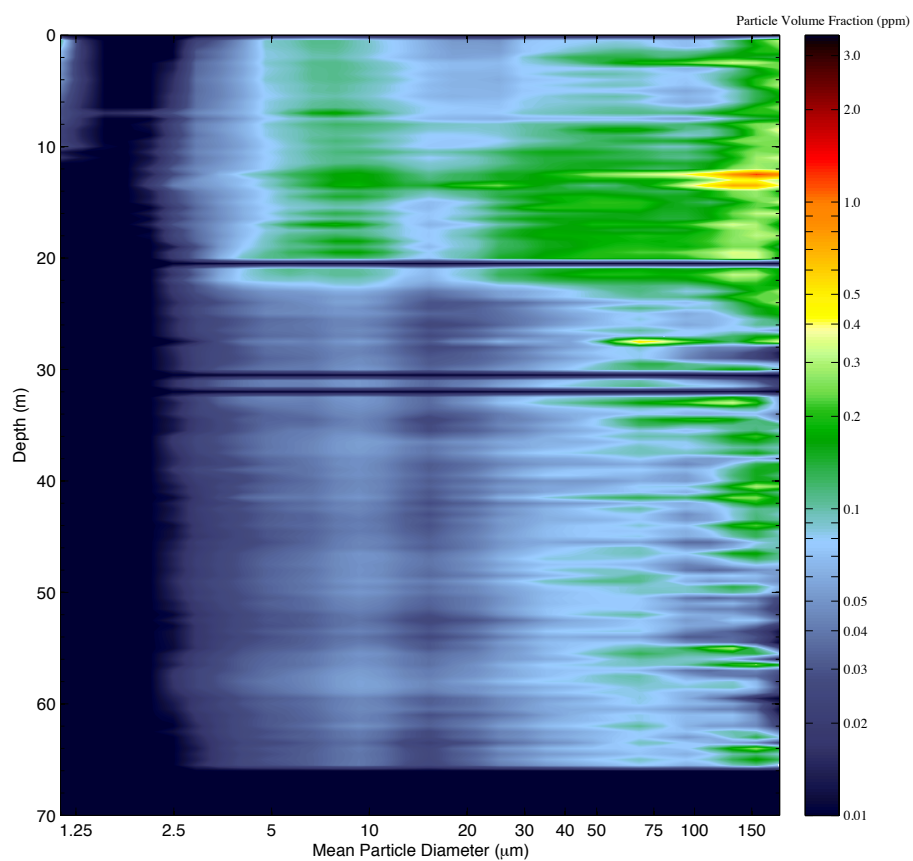
Bottle Nutrients and Chlorophyll

BIOSPACE 2010 Cast 47

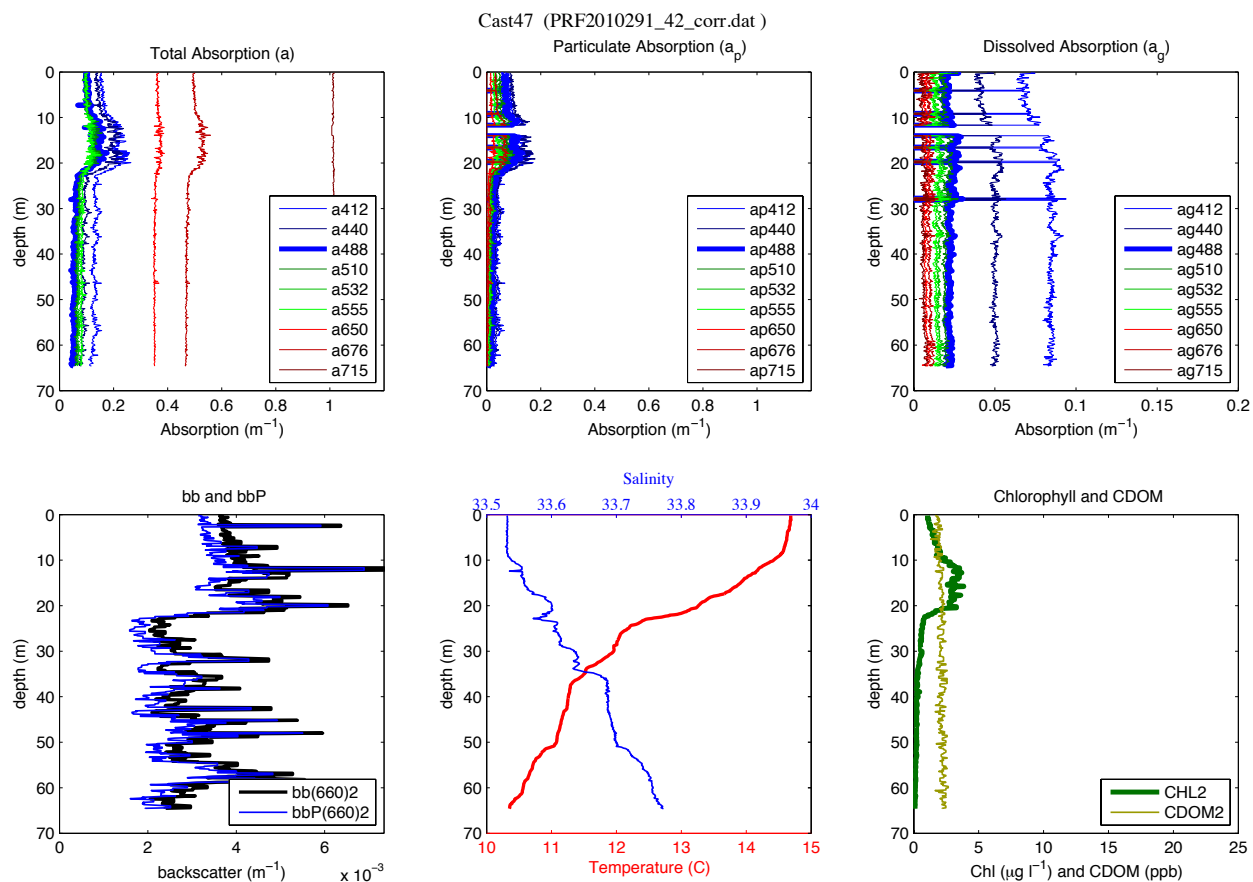


LISST

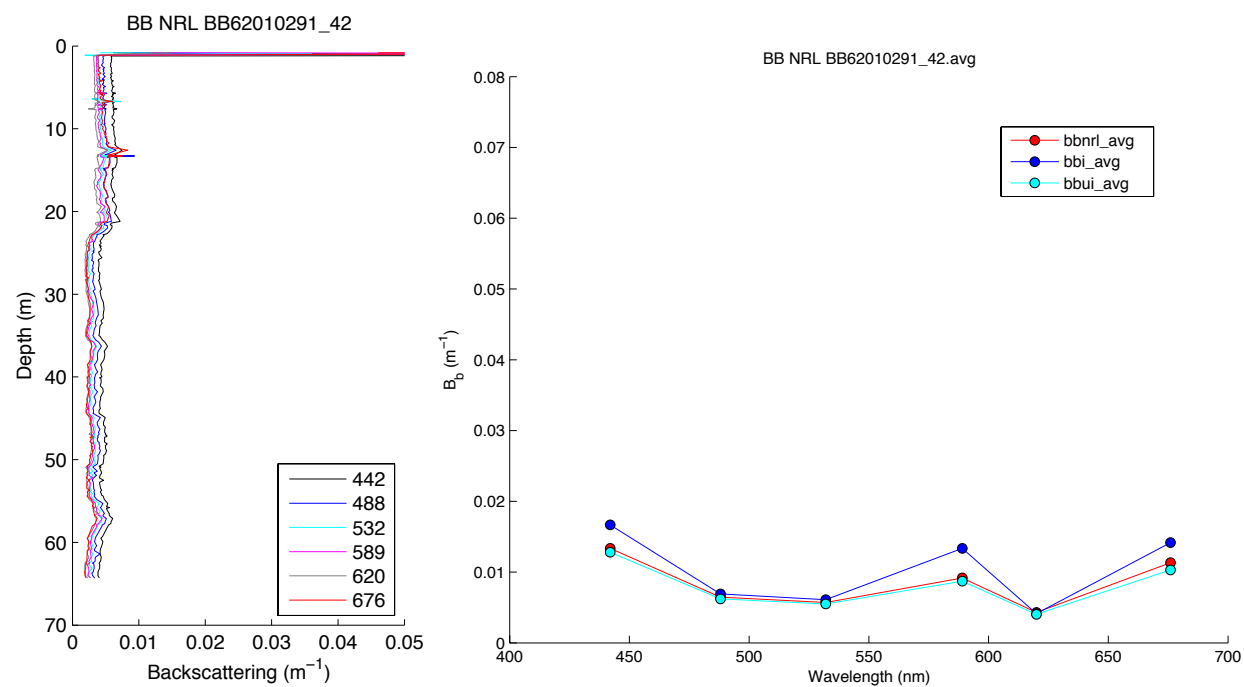
LISST – Cast 47



Optics Profile Package

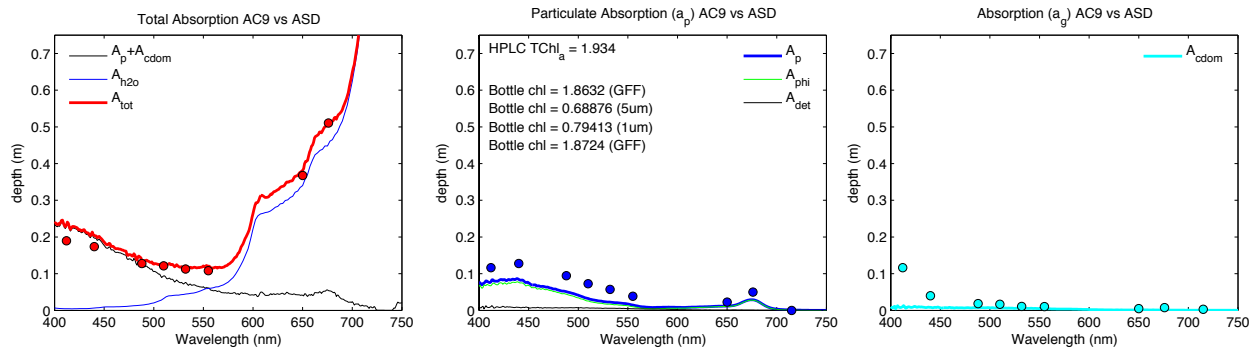


HydroScat

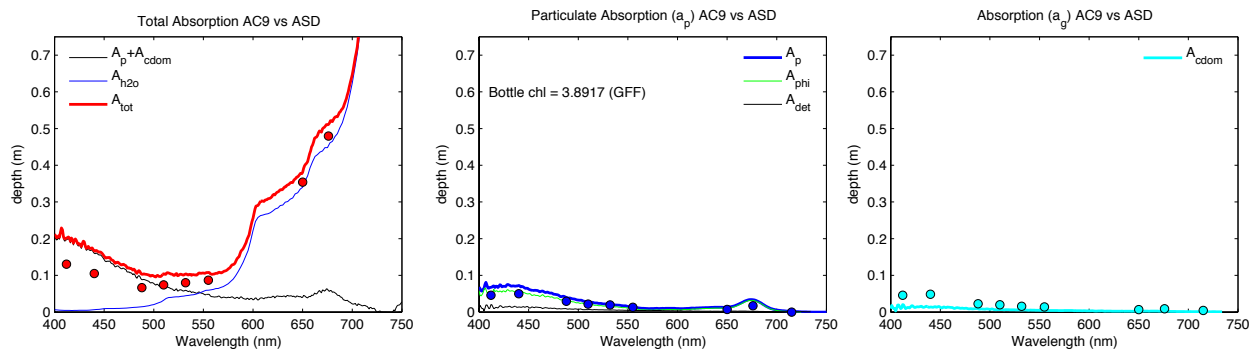


Filter Pad Absorption (w/ AC9)

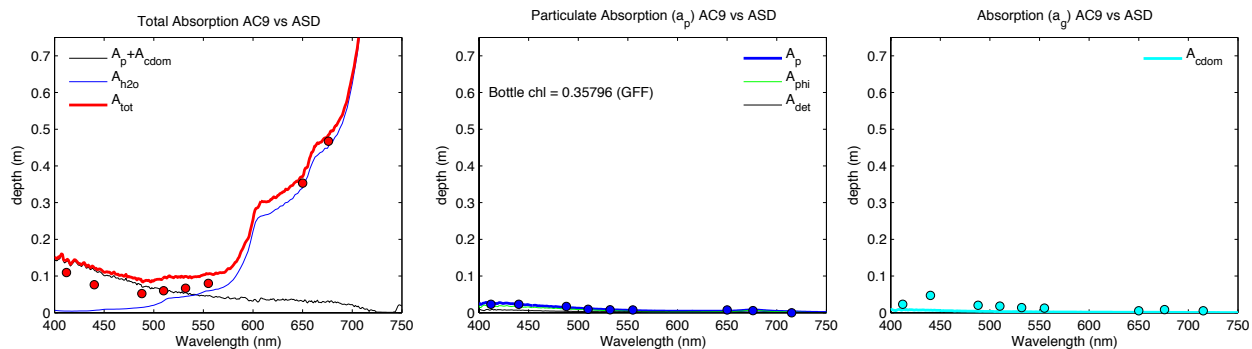
AC9 vs ASD Cast 47 – 0m (PRF2010291_43_corr.dat) CTD 07



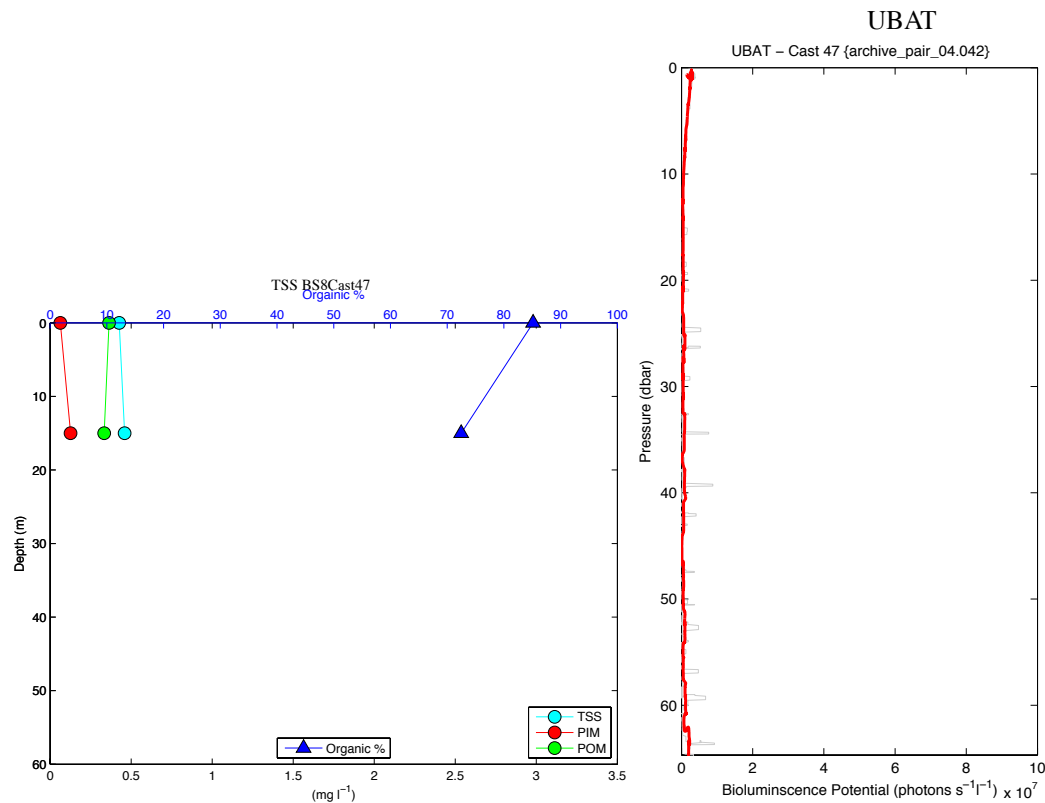
AC9 vs ASD Cast 47 – 15m (PRF2010291_43_corr.dat) CTD 07



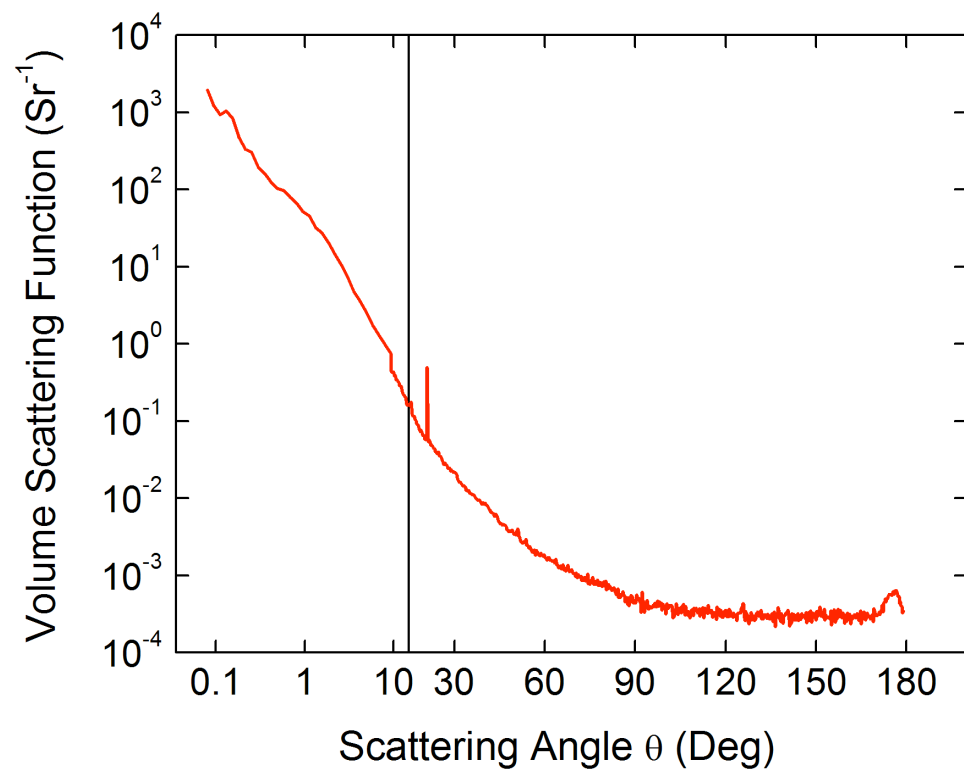
AC9 vs ASD Cast 47 – 40m (PRF2010291_43_corr.dat) CTD 07



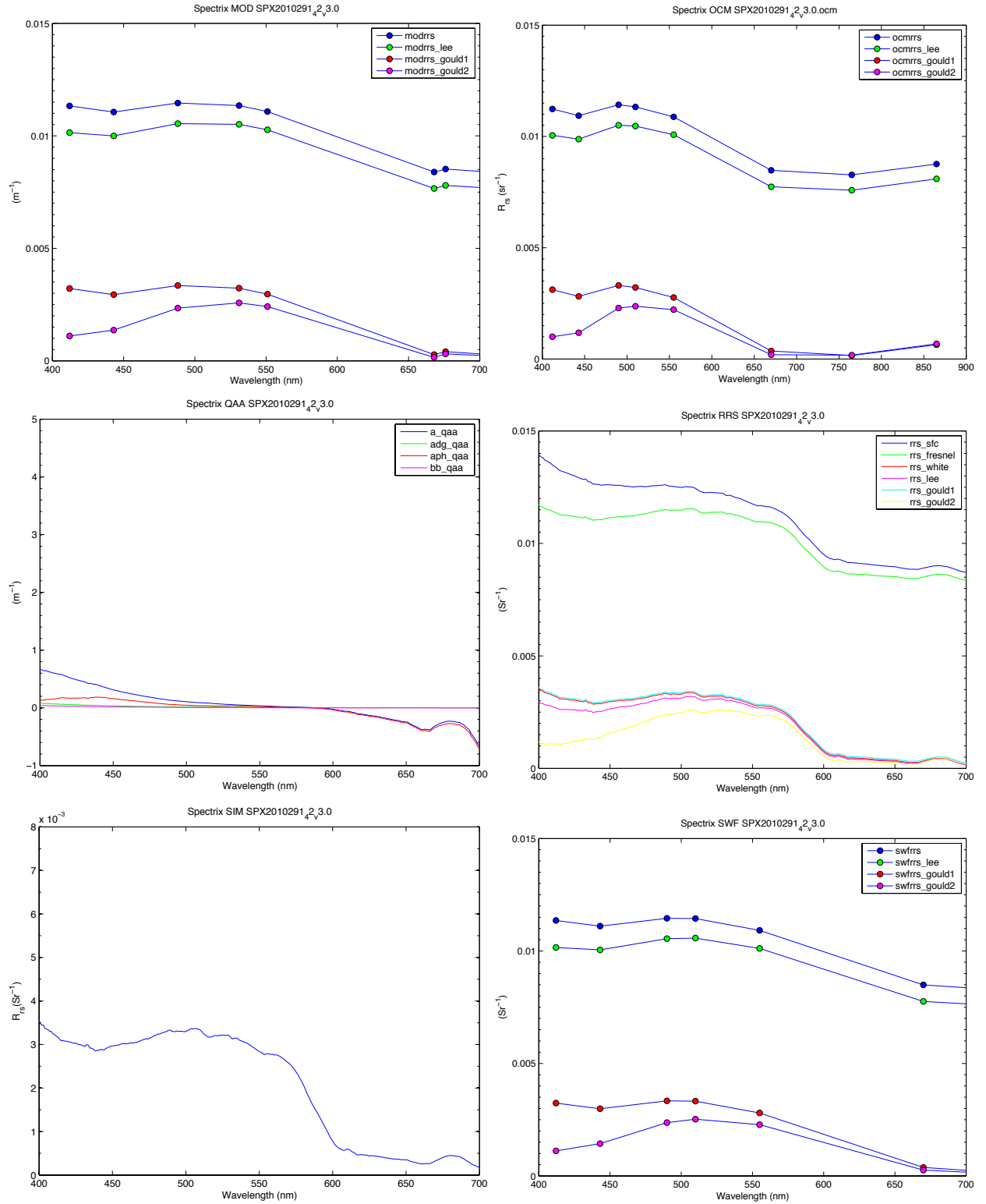
TSS



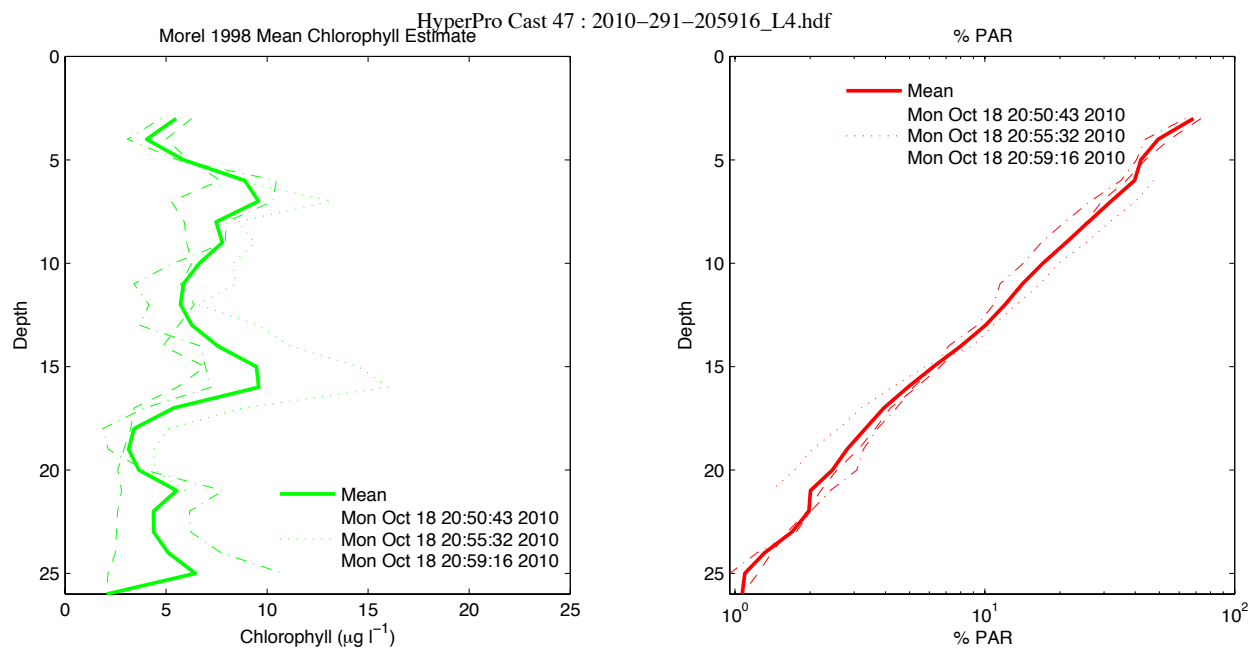
MVSM



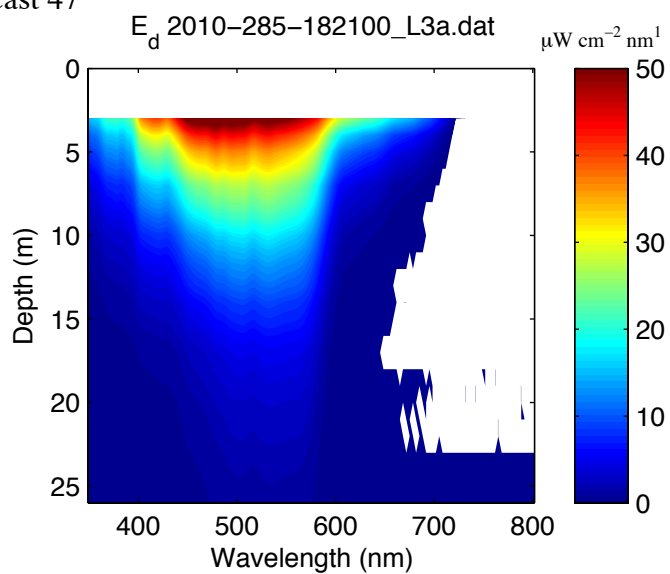
SPECTRIX



HyperPro



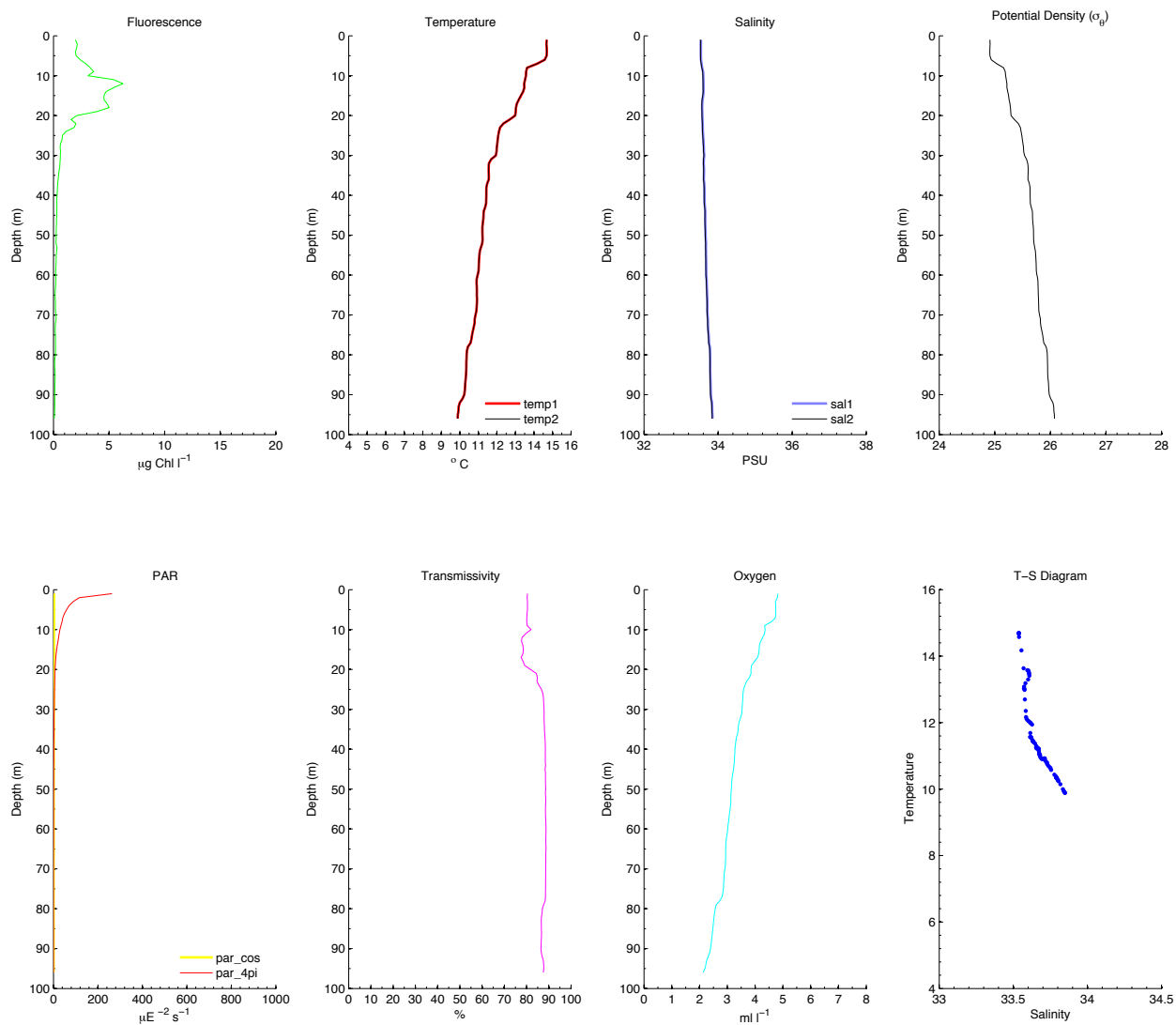
HyperPro Cast 47



Cast 48 (1509 PDT; [Station BS10](#))
(mostly sunny)

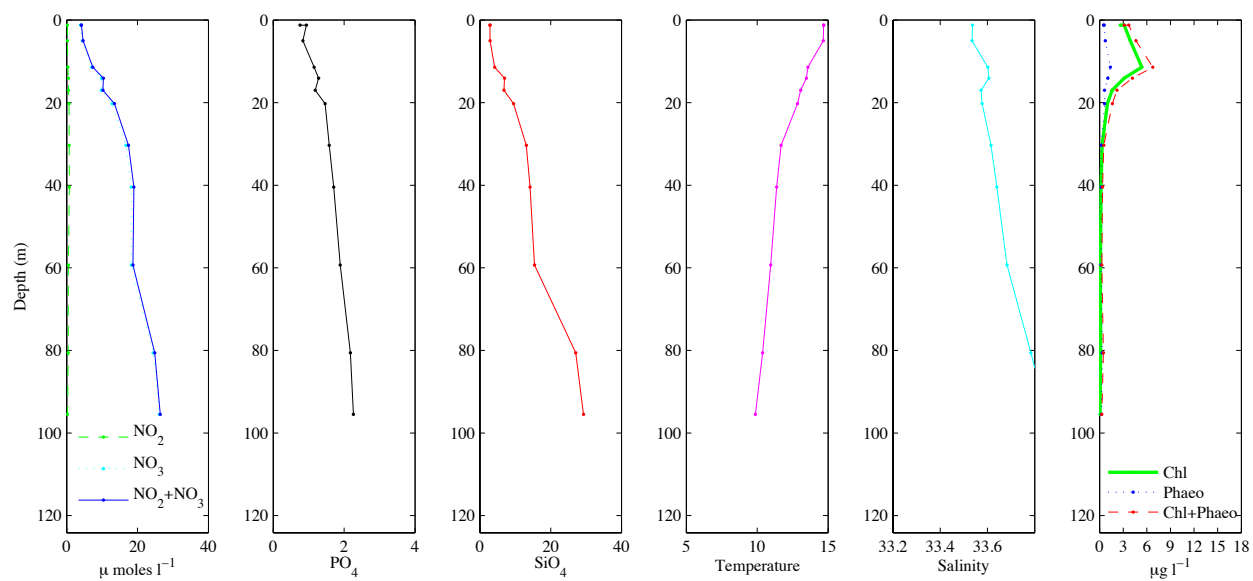
CTD

BIOSPACE 2010 Cast 48 (CTD10; 2010-10-18 22:10:00.000 UTC) CTD Downcast Data (Calibrated)



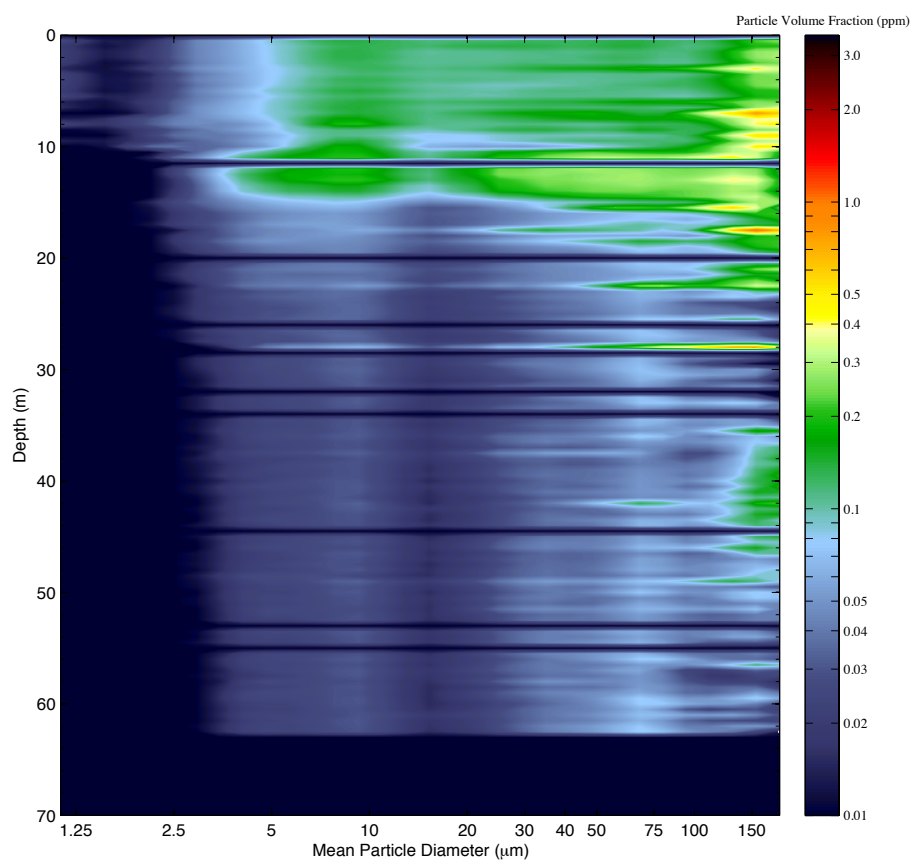
Bottle Nutrients and Chlorophyll

BIOSPACE 2010 Cast 48

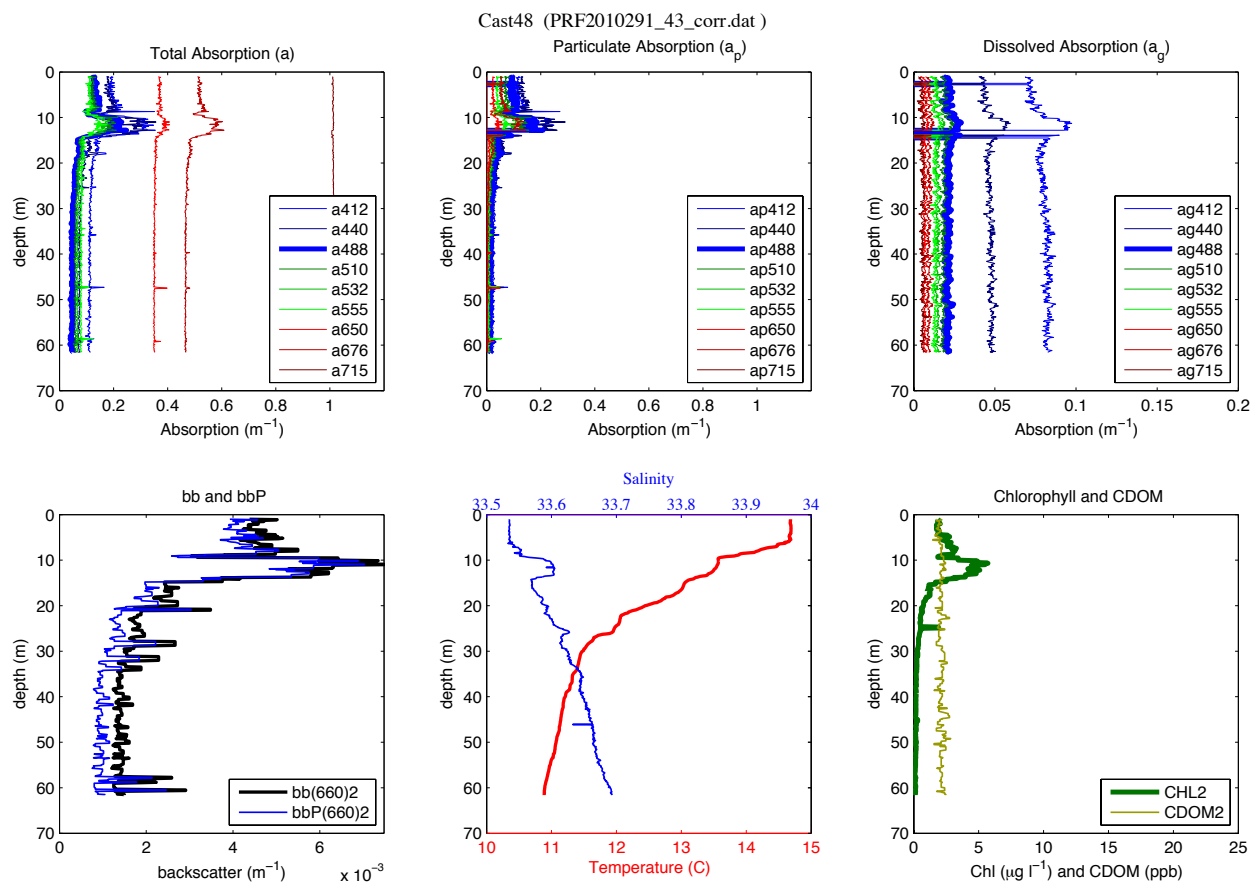


LISST

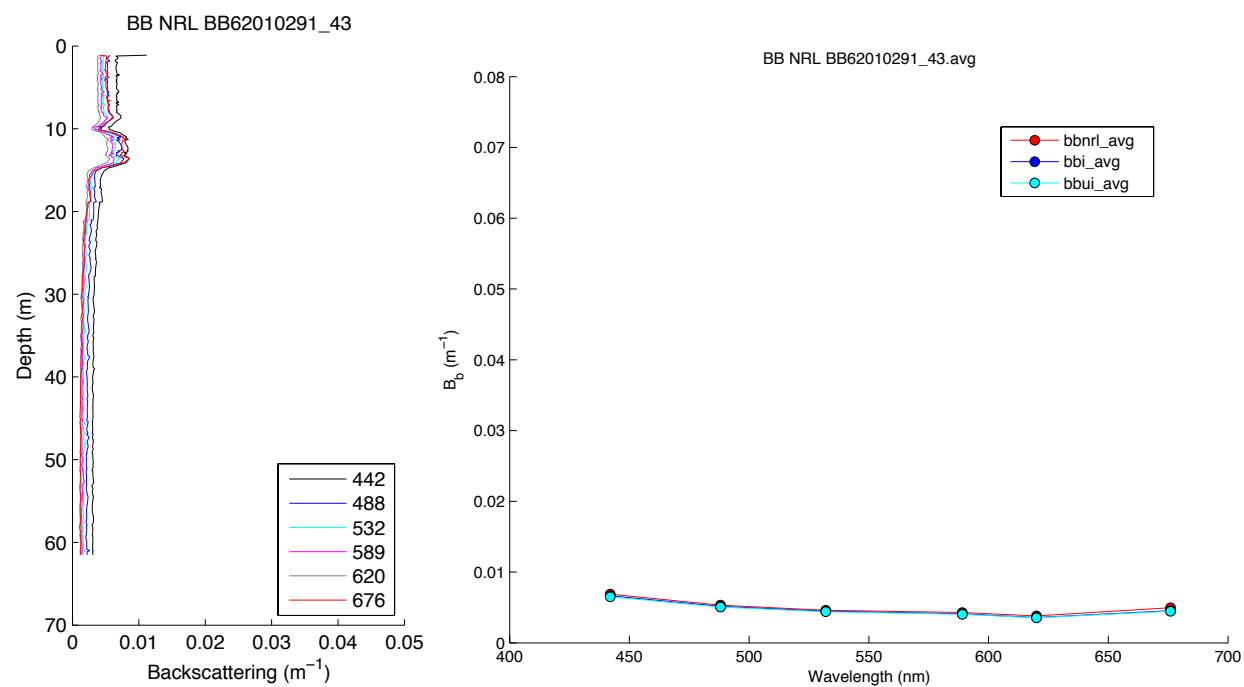
LISST – Cast 48



Optics Profile Package

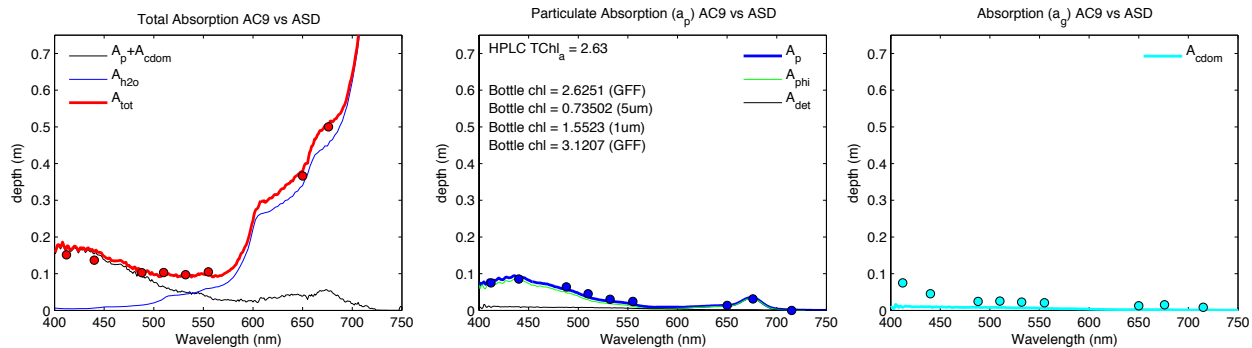


HydroScat

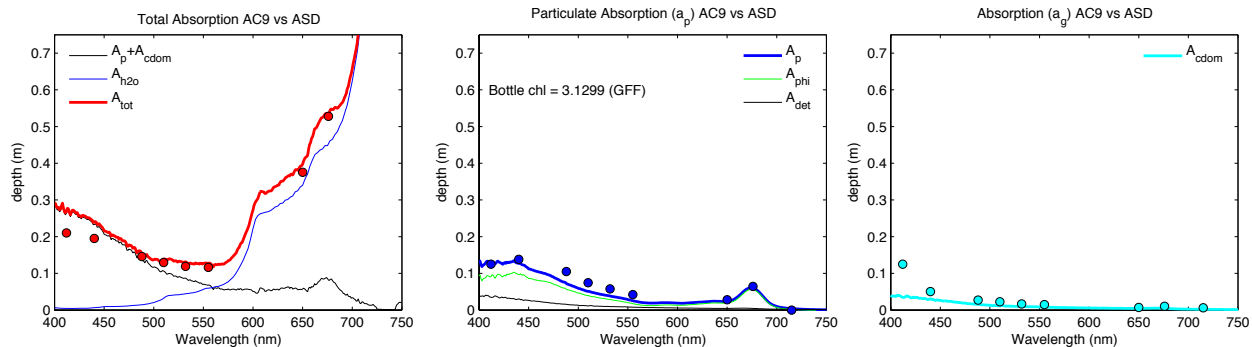


Filter Pad Absorption (w/ AC9)

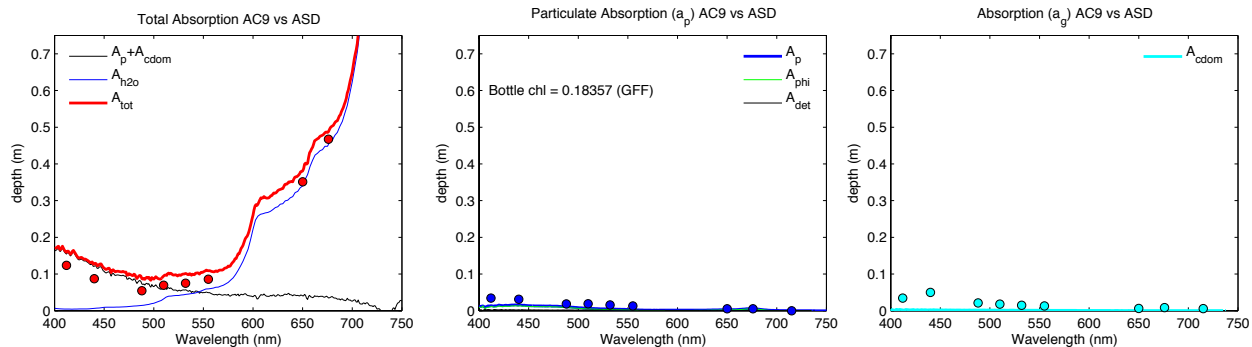
AC9 vs ASD Cast 48 – 0m (PRF2010291_42_corr.dat) CTD 06



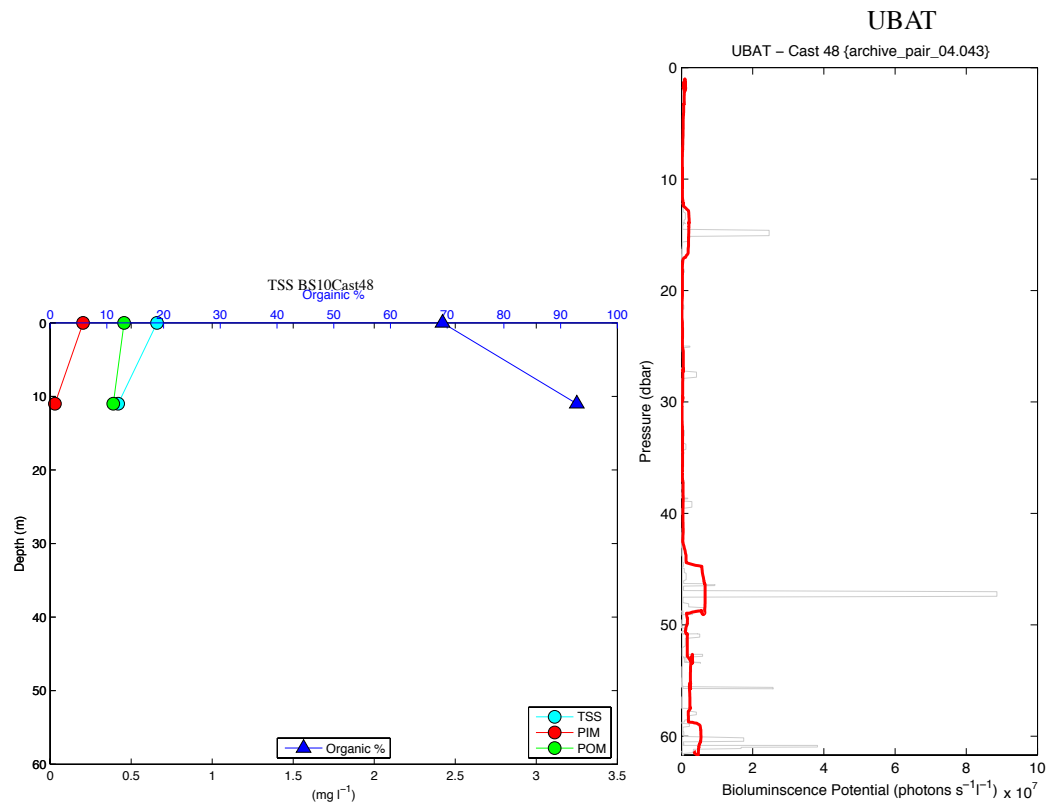
AC9 vs ASD Cast 48 – 15m (PRF2010291_42_corr.dat) CTD 06



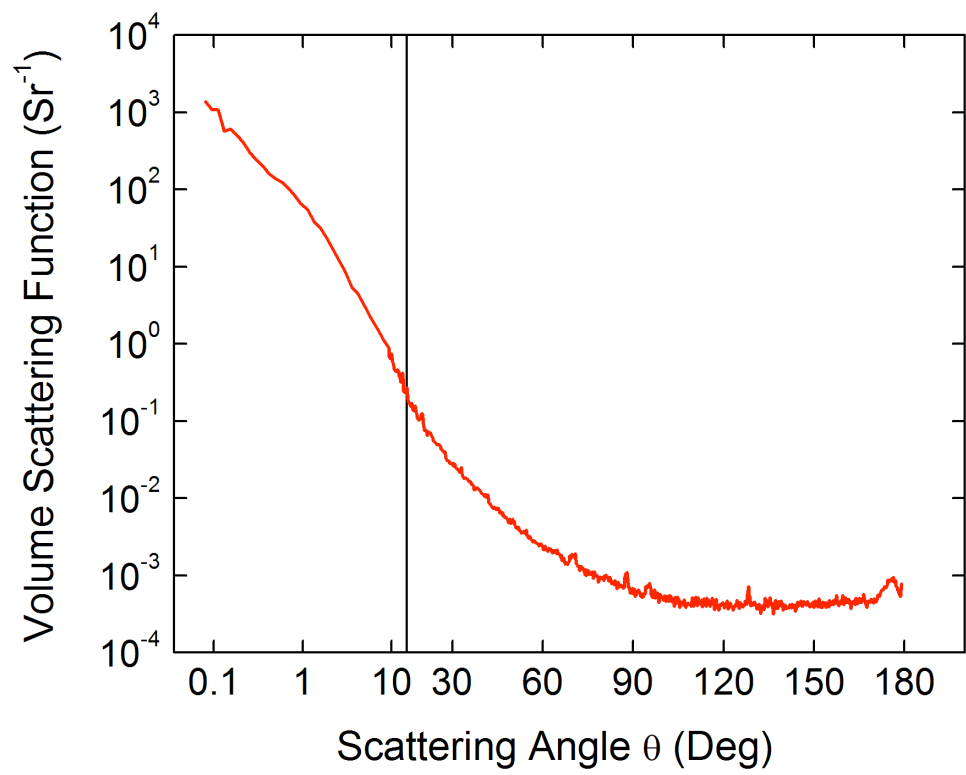
AC9 vs ASD Cast 48 – 40m (PRF2010291_42_corr.dat) CTD 06



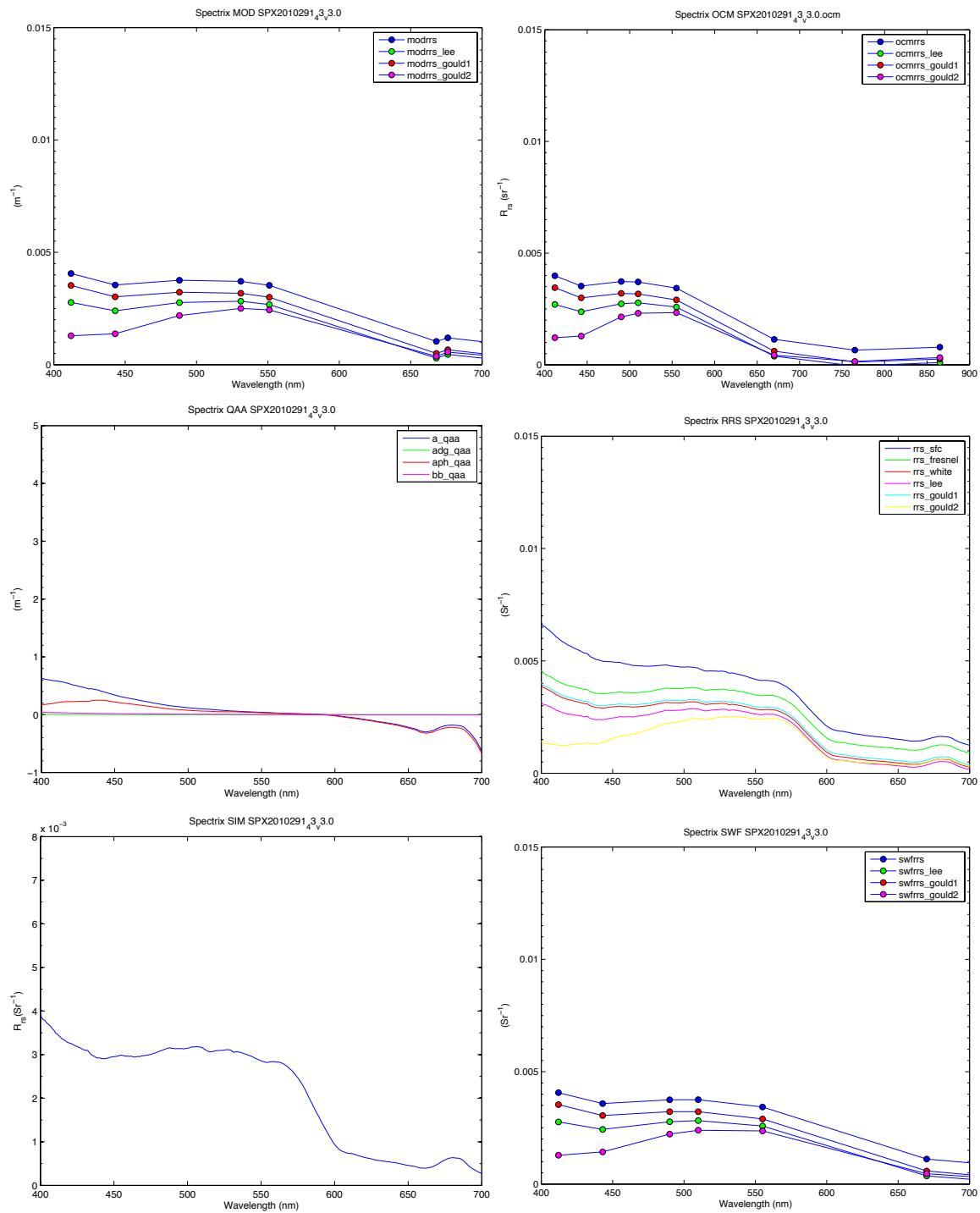
TSS



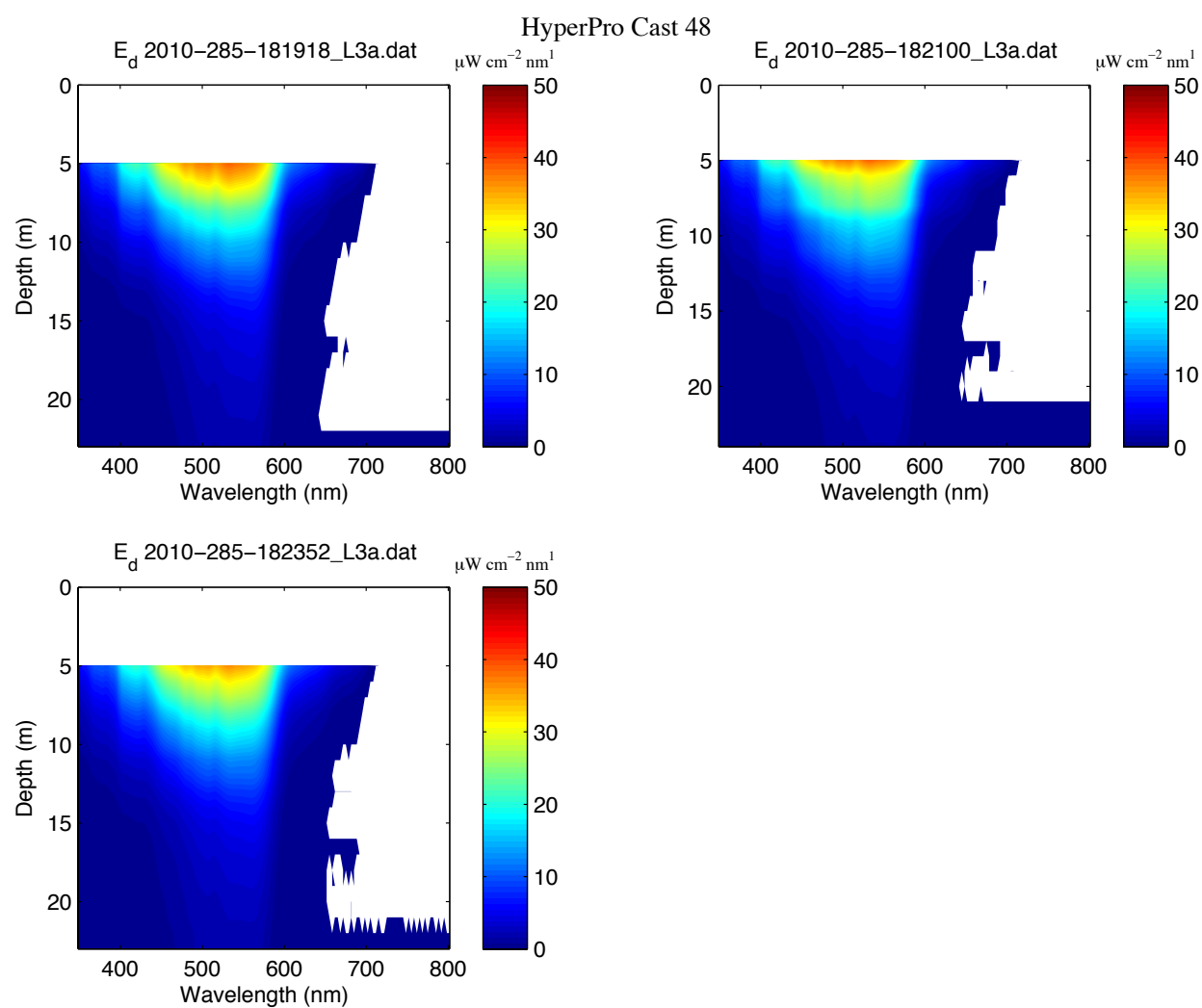
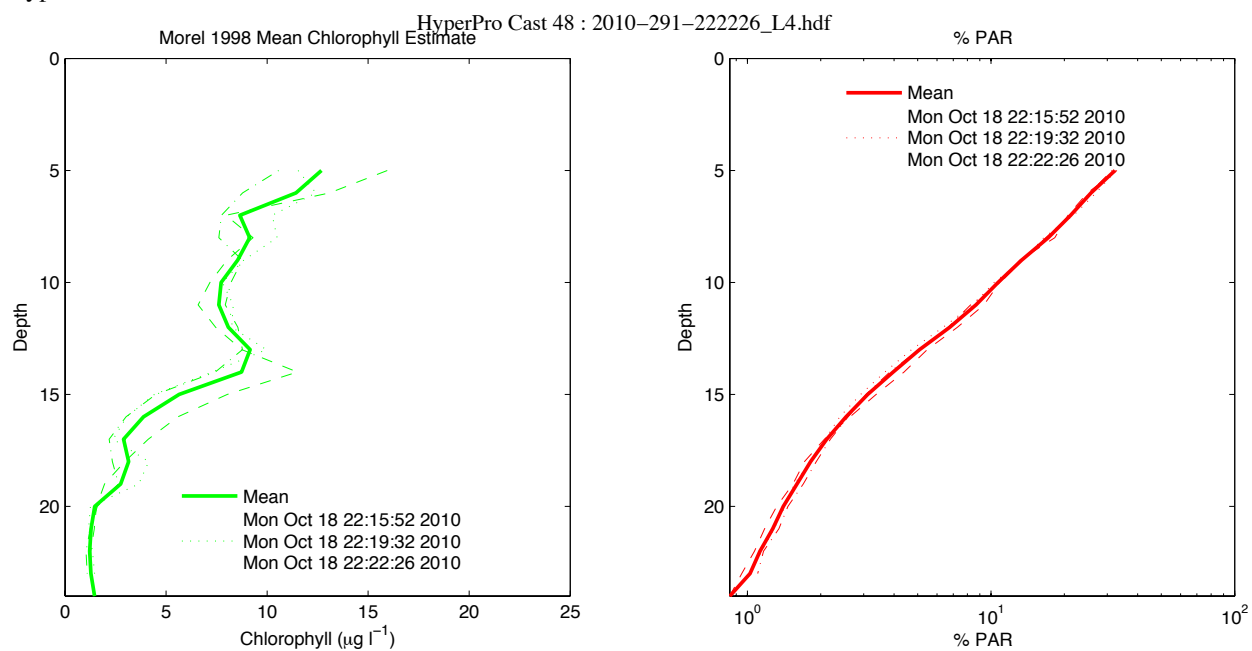
MVSM



SPECTRIX



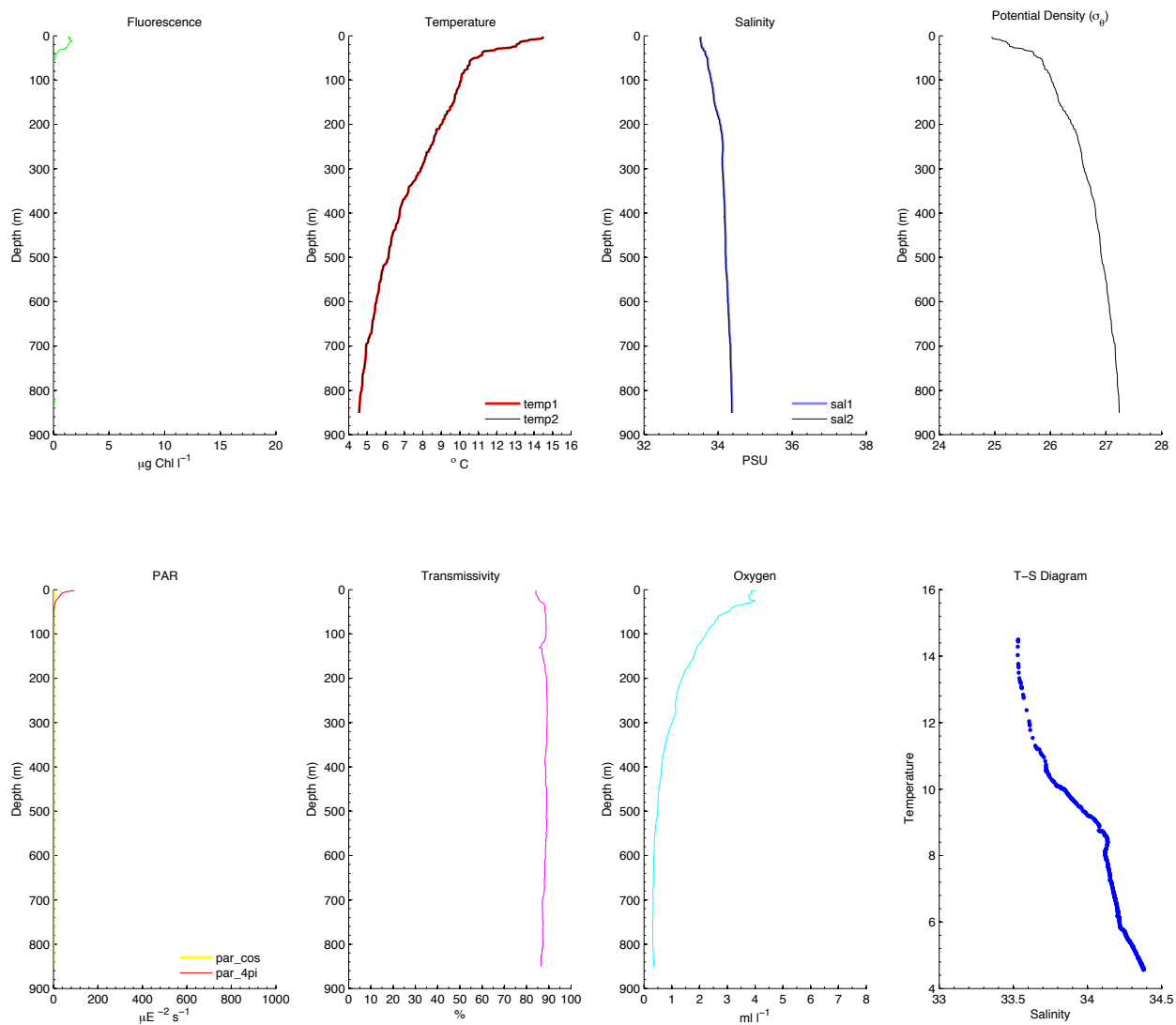
HyperPro



Cast 49 (1635 PDT; [Station BS11](#))
(near MBARI M1) (mostly sunny)

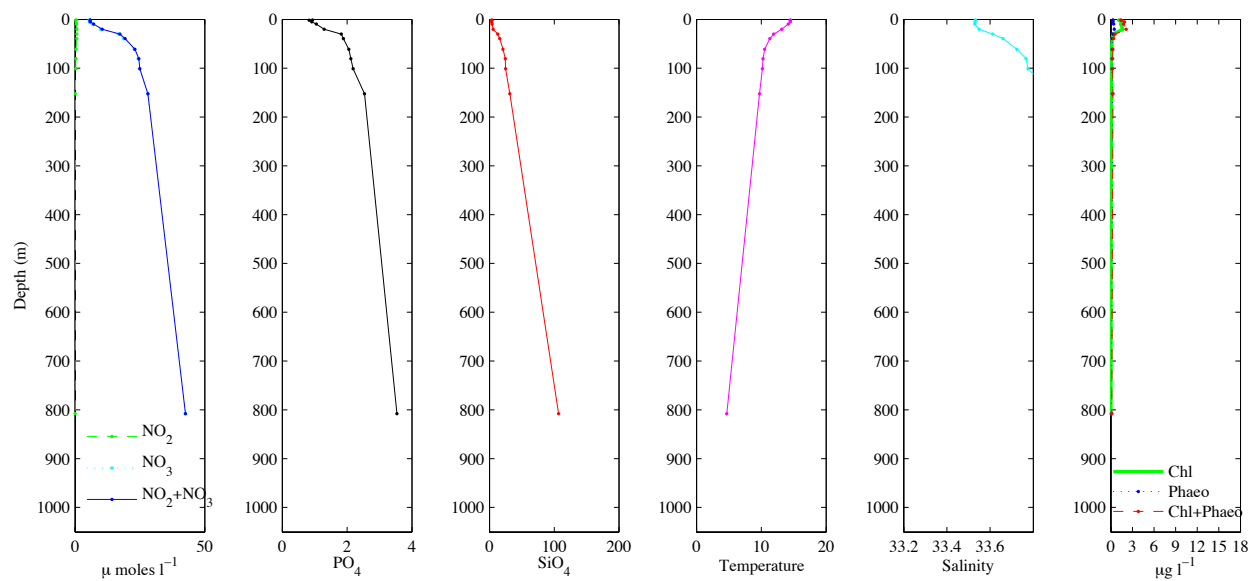
CTD

BIOSPACE 2010 Cast 49 (CTD11; 2010-10-18 23:37:00.000 UTC) CTD Downcast Data (Calibrated)



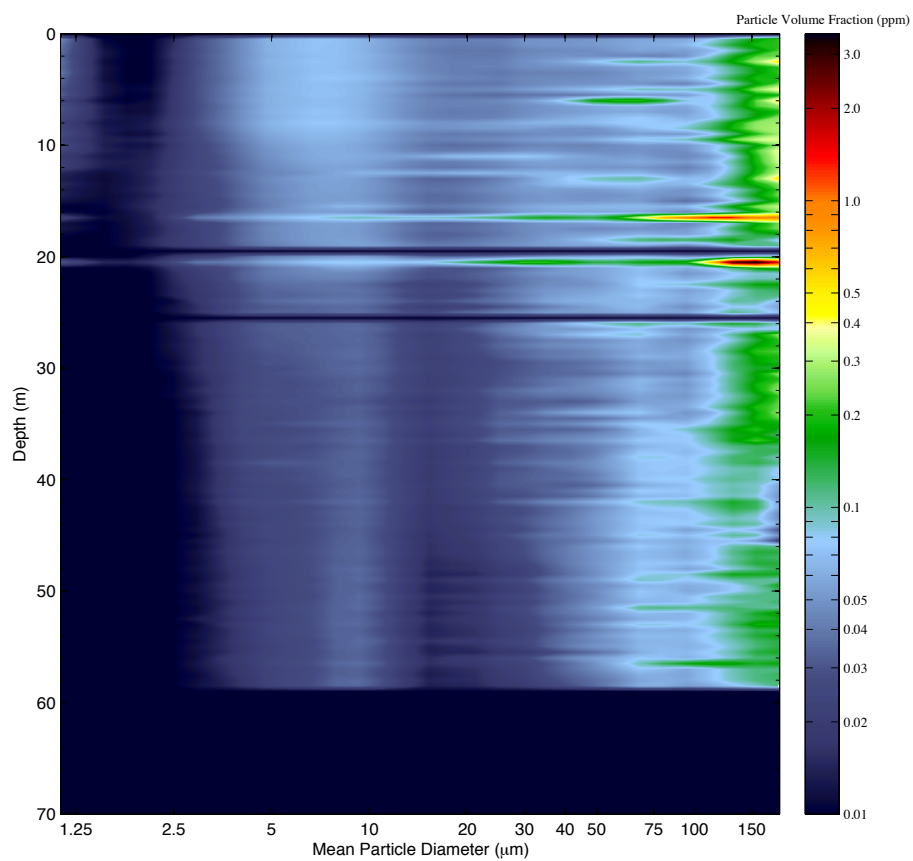
Bottle Nutrients and Chlorophyll

BIOSPACE 2010 Cast 49

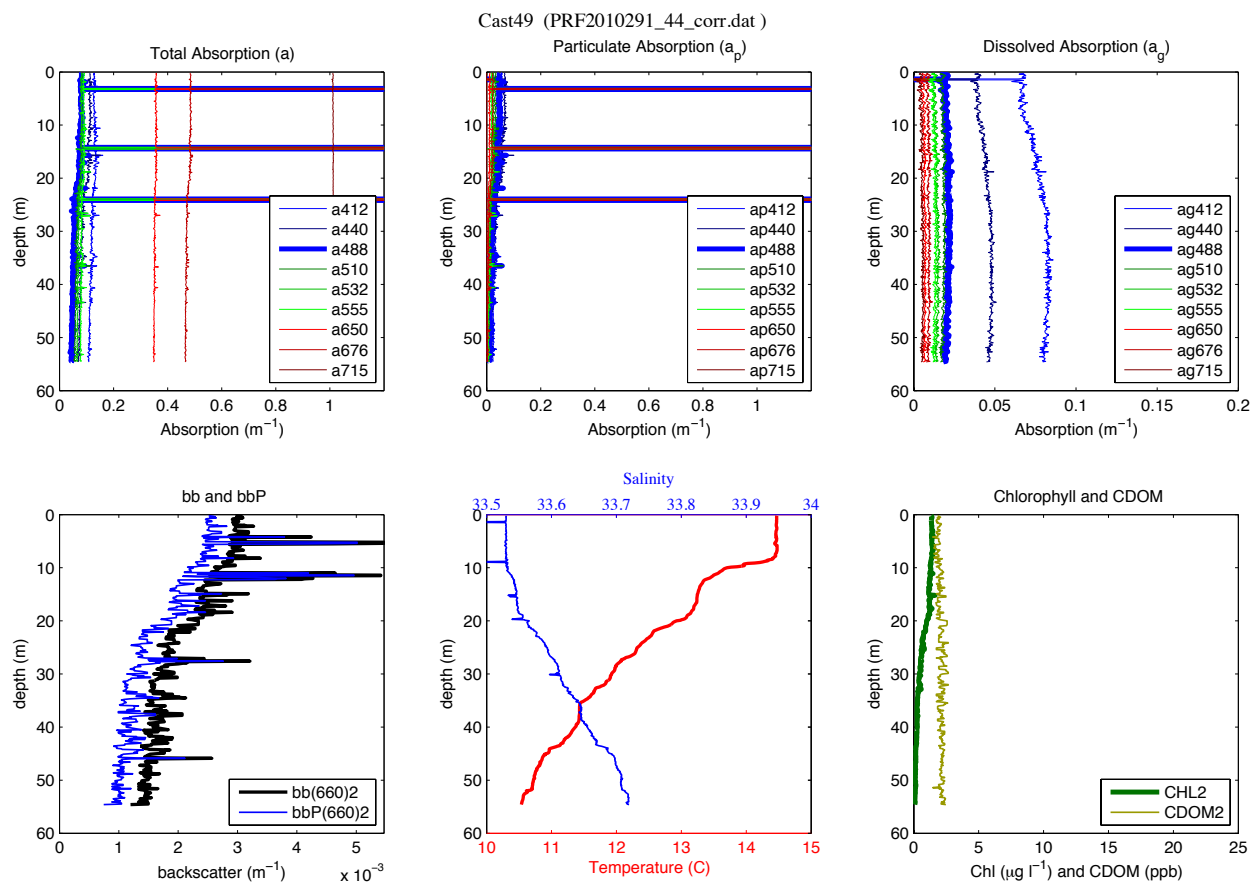


LISST

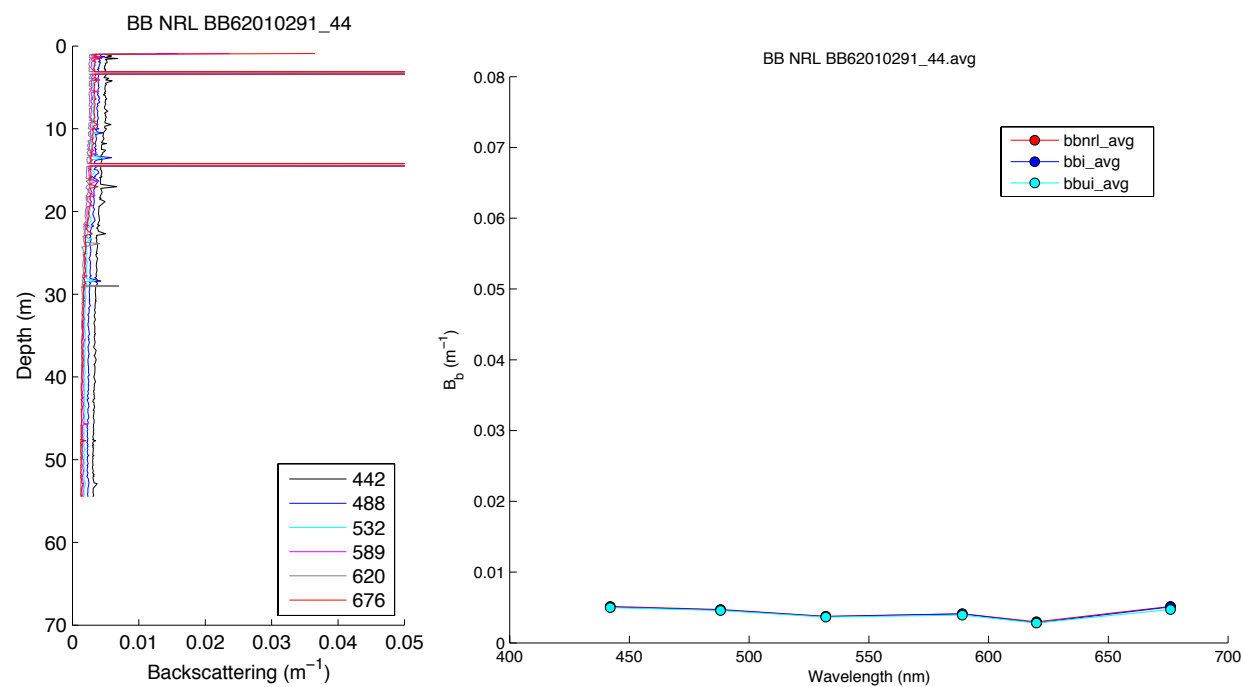
LISST – Cast 49



Optics Profile Package

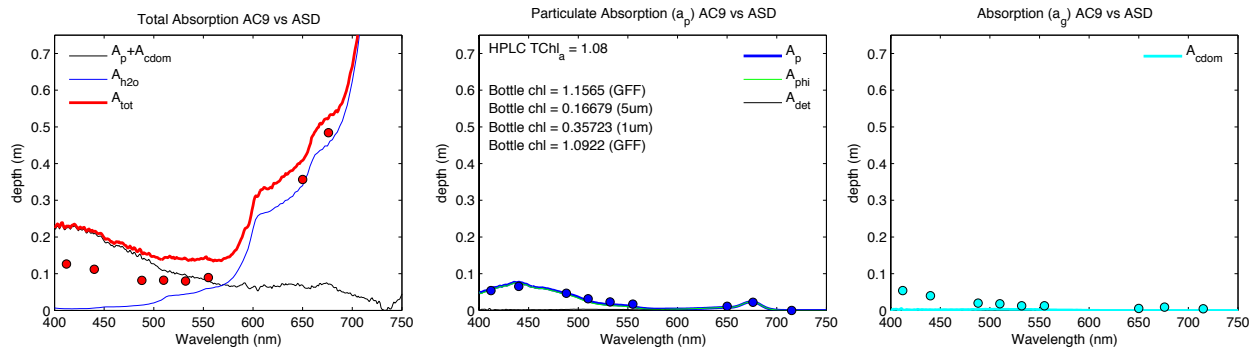


HydroScat

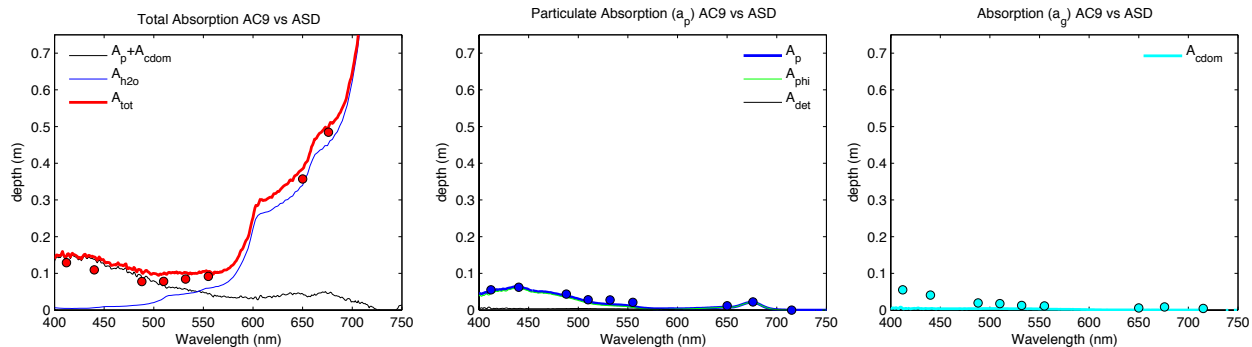


Filter Pad Absorption (w/ AC9)

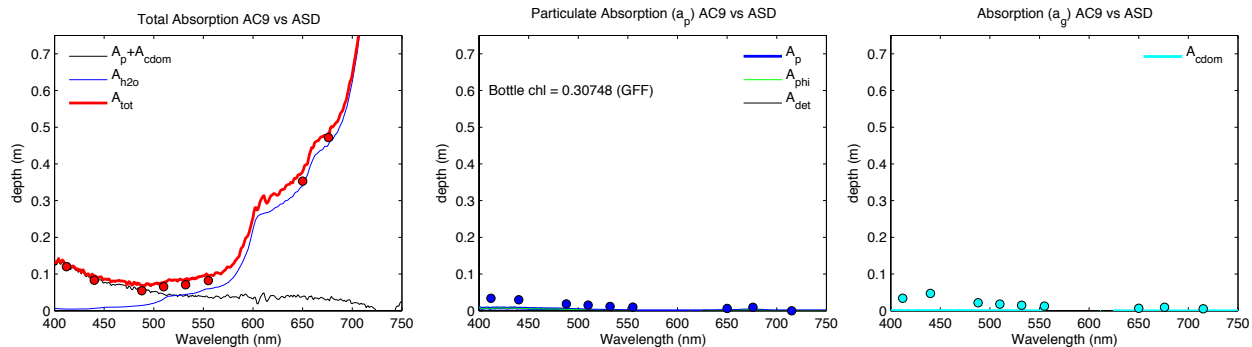
AC9 vs ASD Cast 49 – 0m (PRF2010291_44_corr.dat) CTD 08



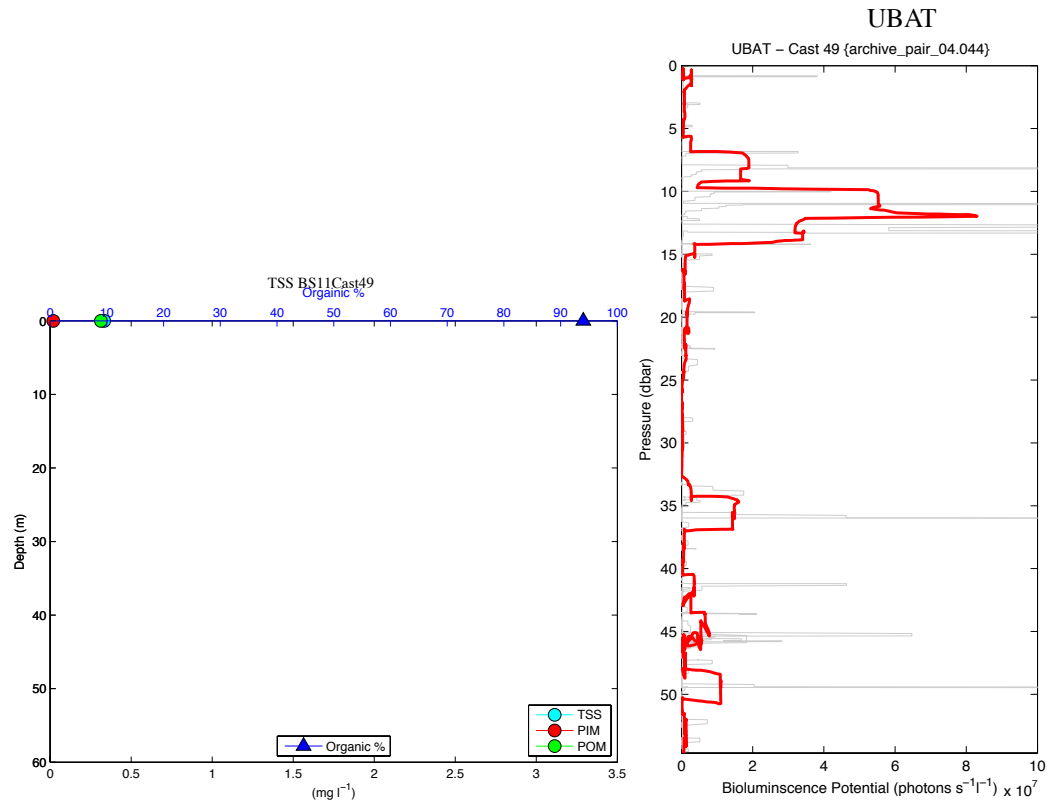
AC9 vs ASD Cast 49 – 11m (PRF2010291_44_corr.dat) CTD 08



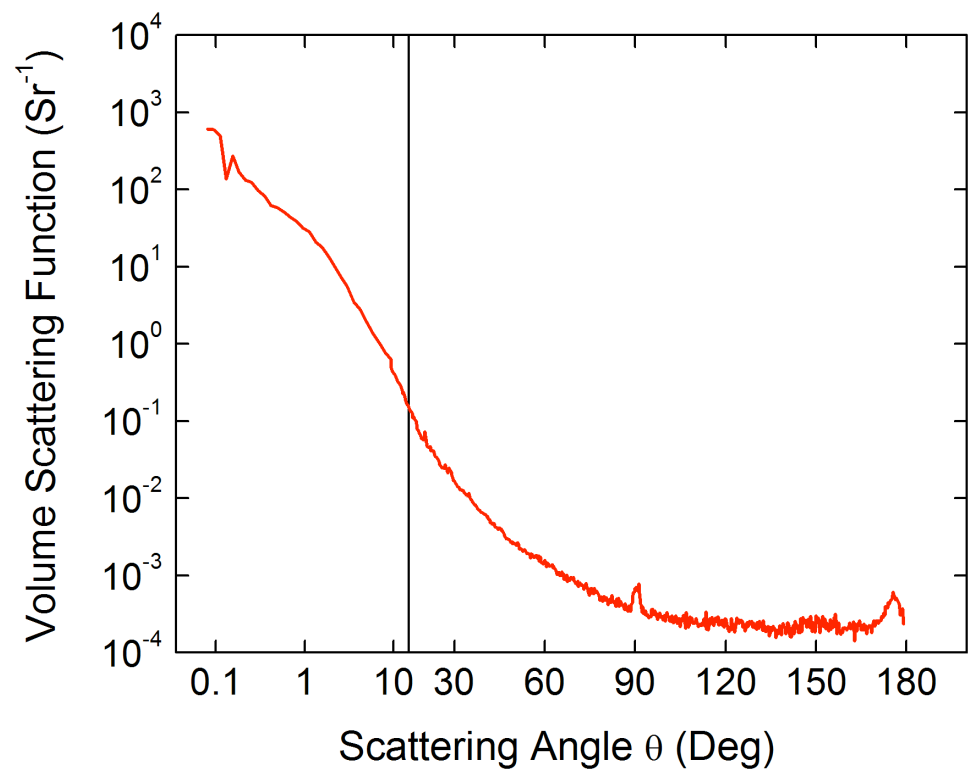
AC9 vs ASD Cast 49 – 30m (PRF2010291_44_corr.dat) CTD 08



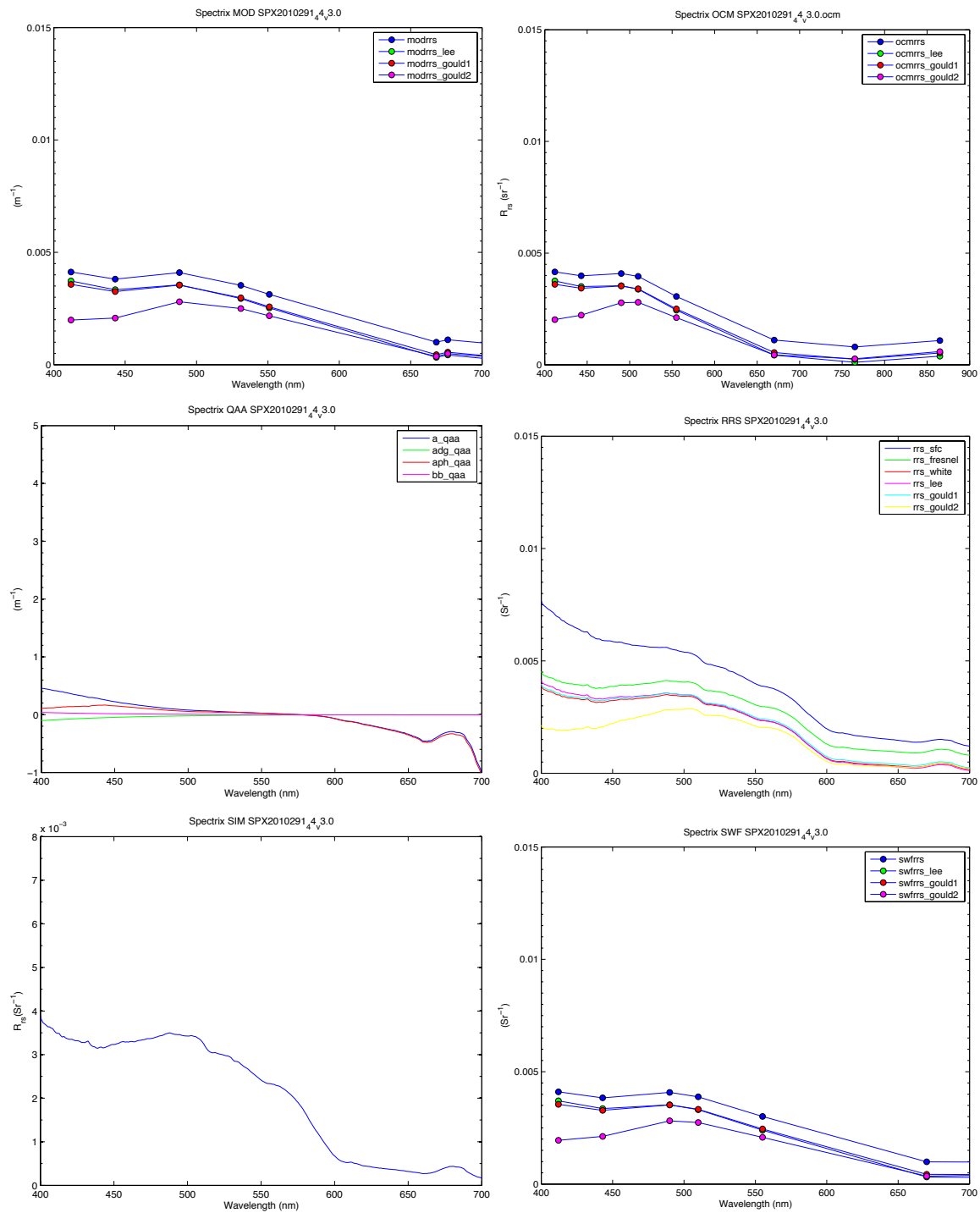
TSS



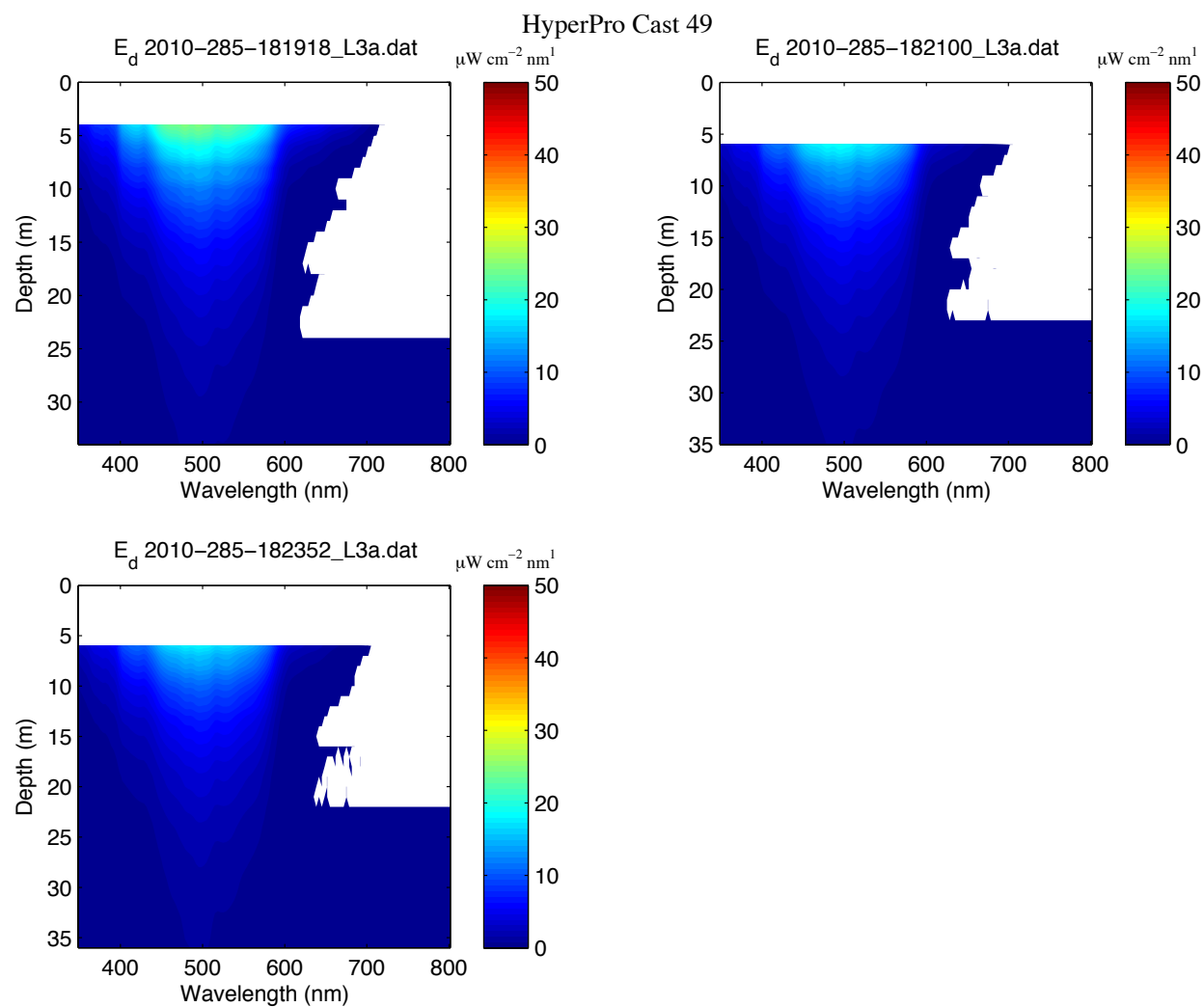
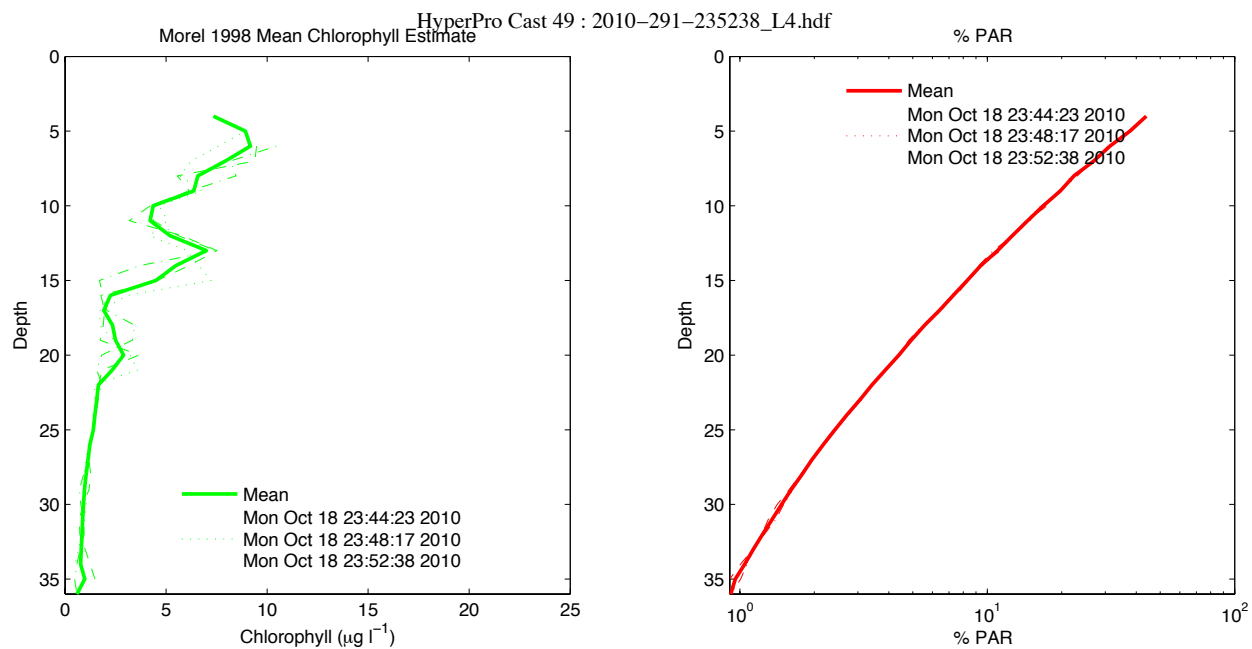
MVSM



SPECTRIX



HyperPro

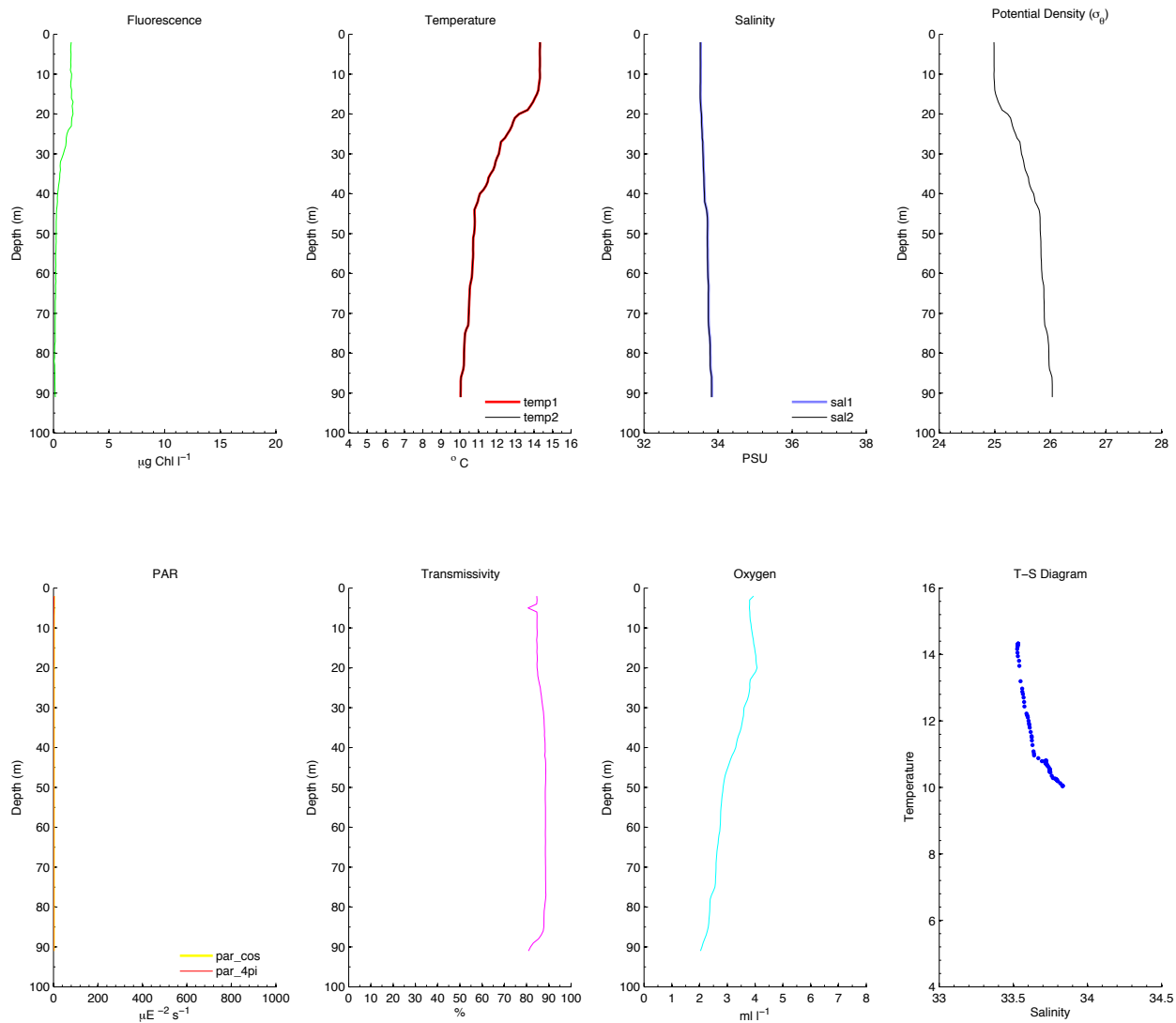


Cast 50 (1830 PDT; [Station BS12](#))

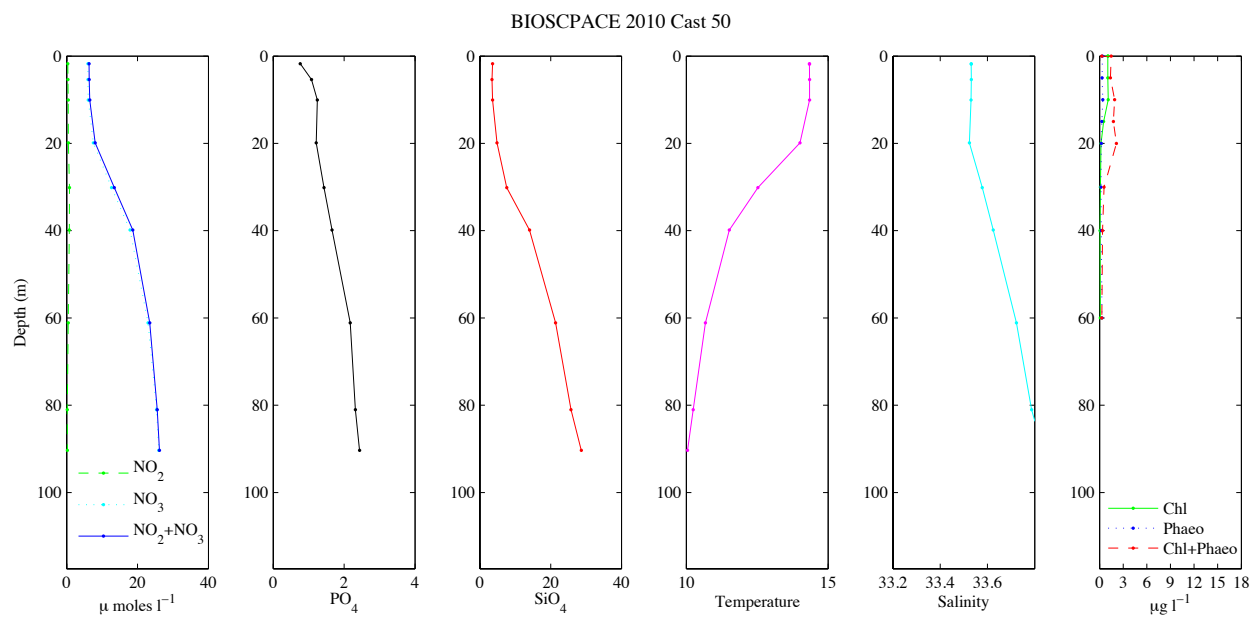
(sunset, hazy)

CTD

BIOSPACE 2010 Cast 50 (CTD12; 2010-10-19 01:33:00.000 UTC) CTD Downcast Data (Calibrated)

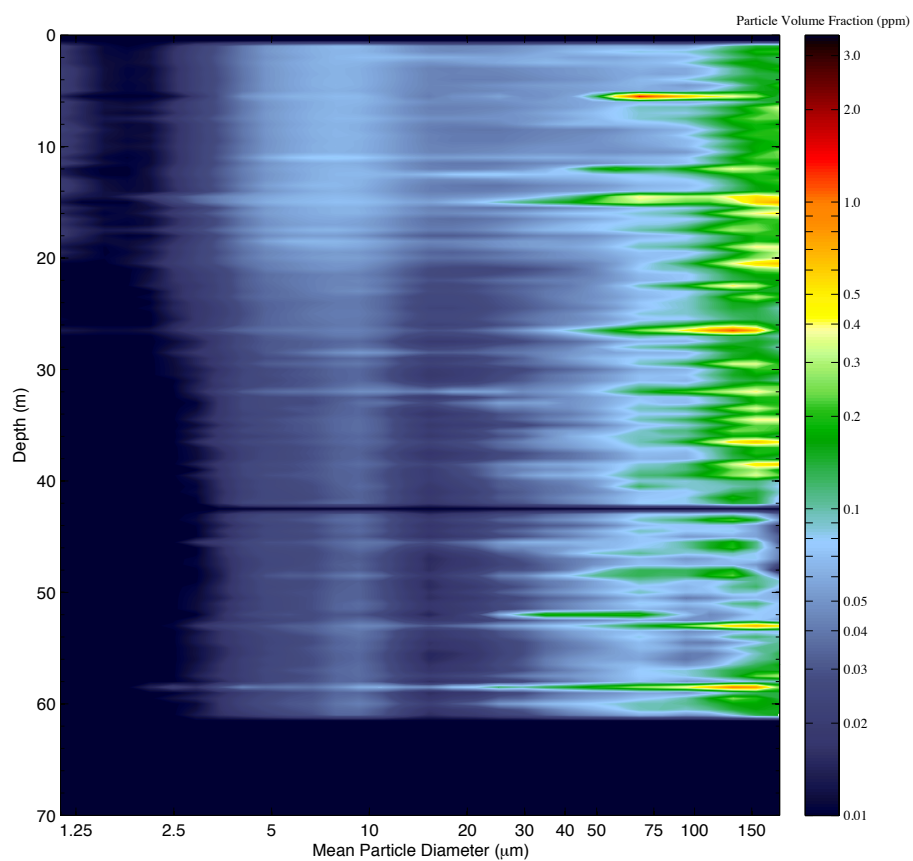


Bottle Nutrients and Chlorophyll

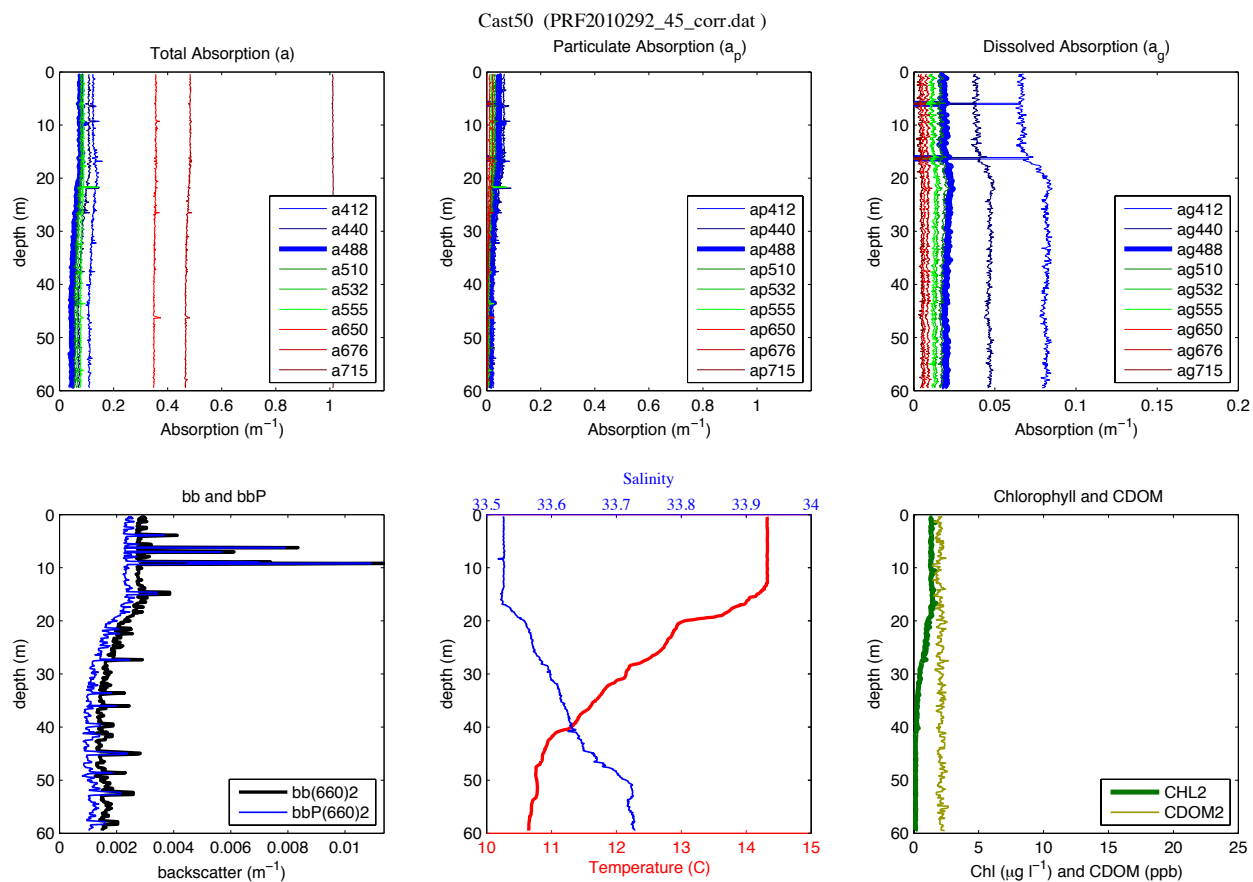


LISST

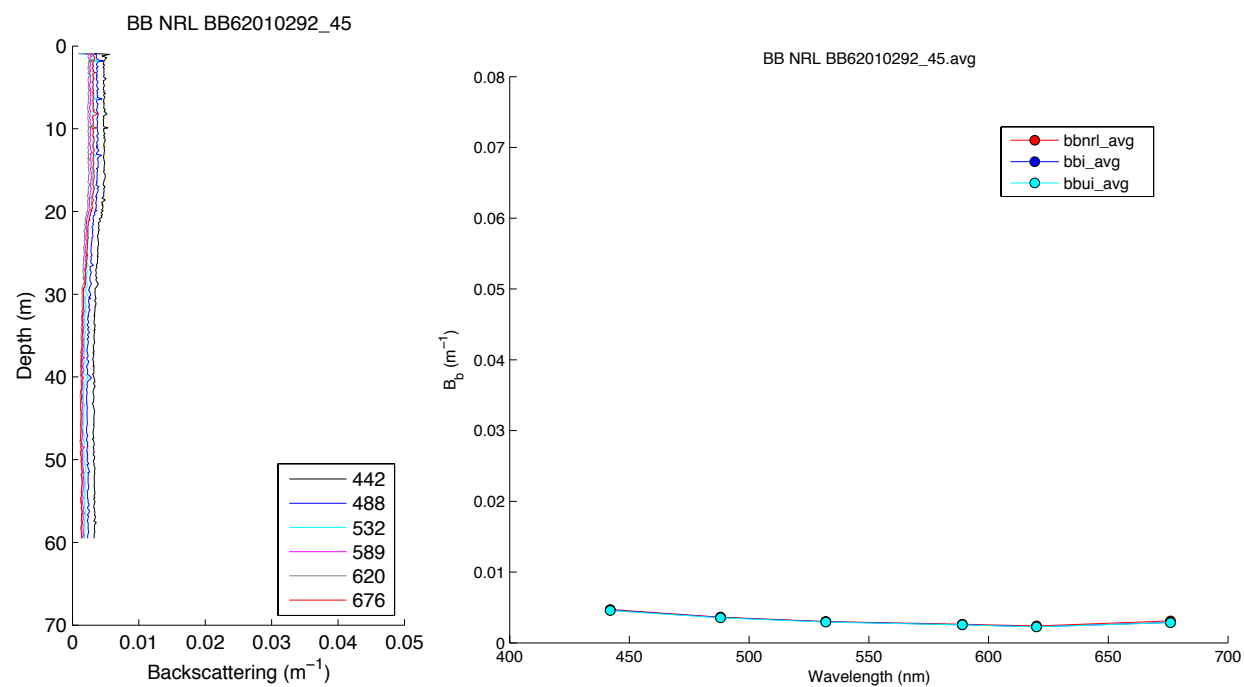
LISST – Cast 50



Optics Profile Package

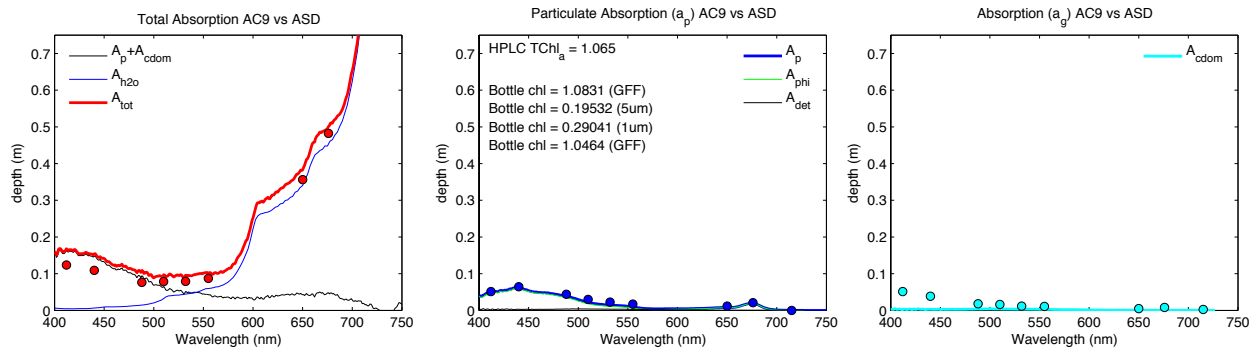


HydroScat

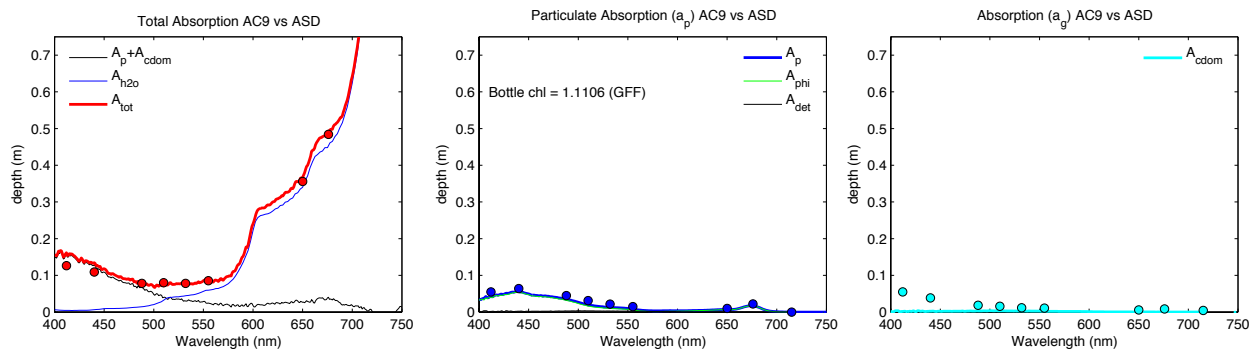


Filter Pad Absorption (w/ AC9)

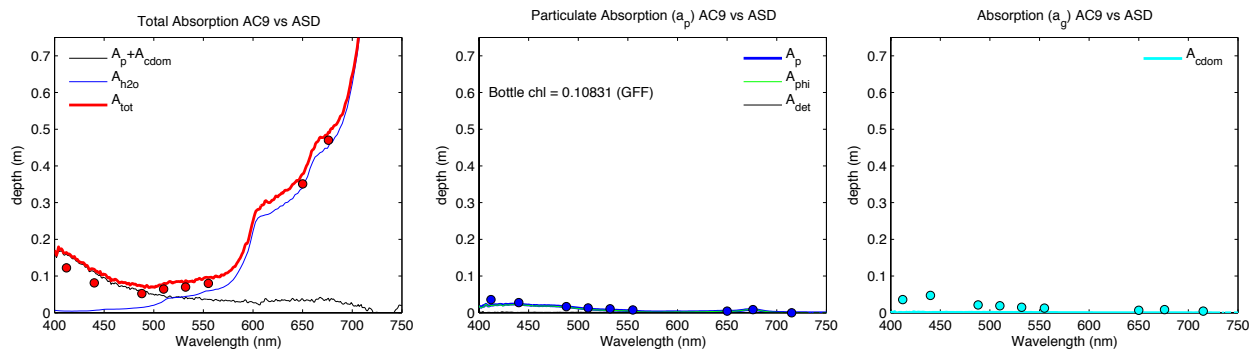
AC9 vs ASD Cast 50 – 0m (PRF2010292_45_corr.dat) CTD 10



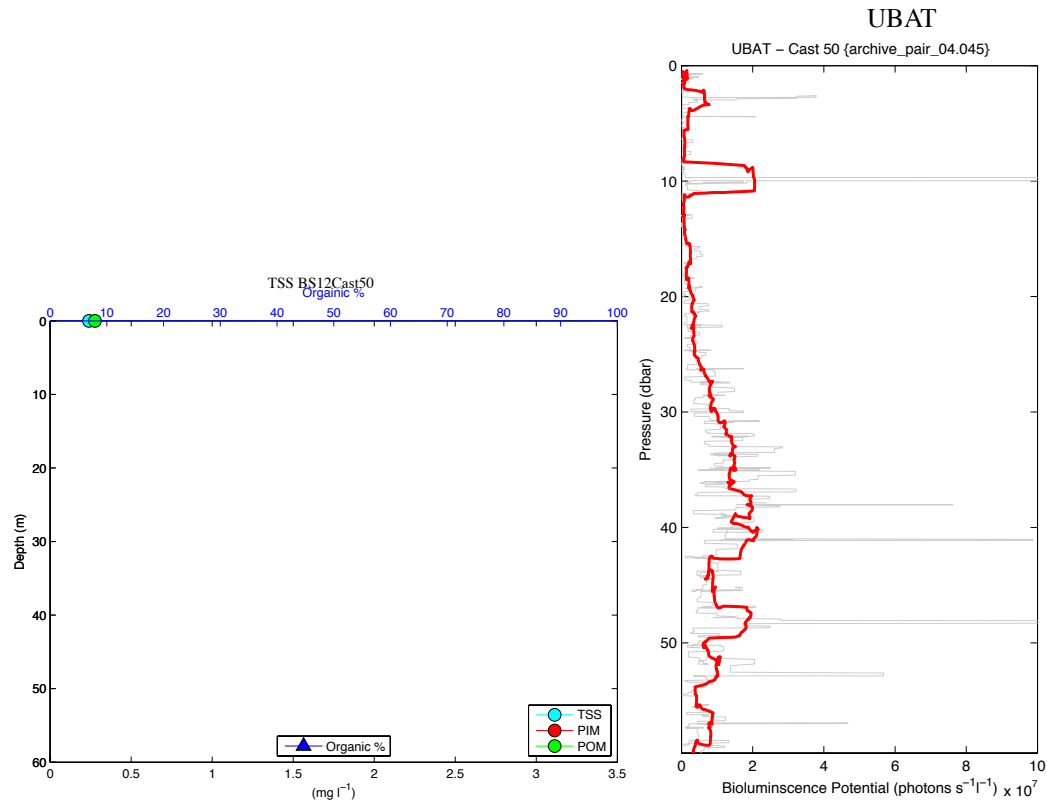
AC9 vs ASD Cast 50 – 10m (PRF2010292_45_corr.dat) CTD 10



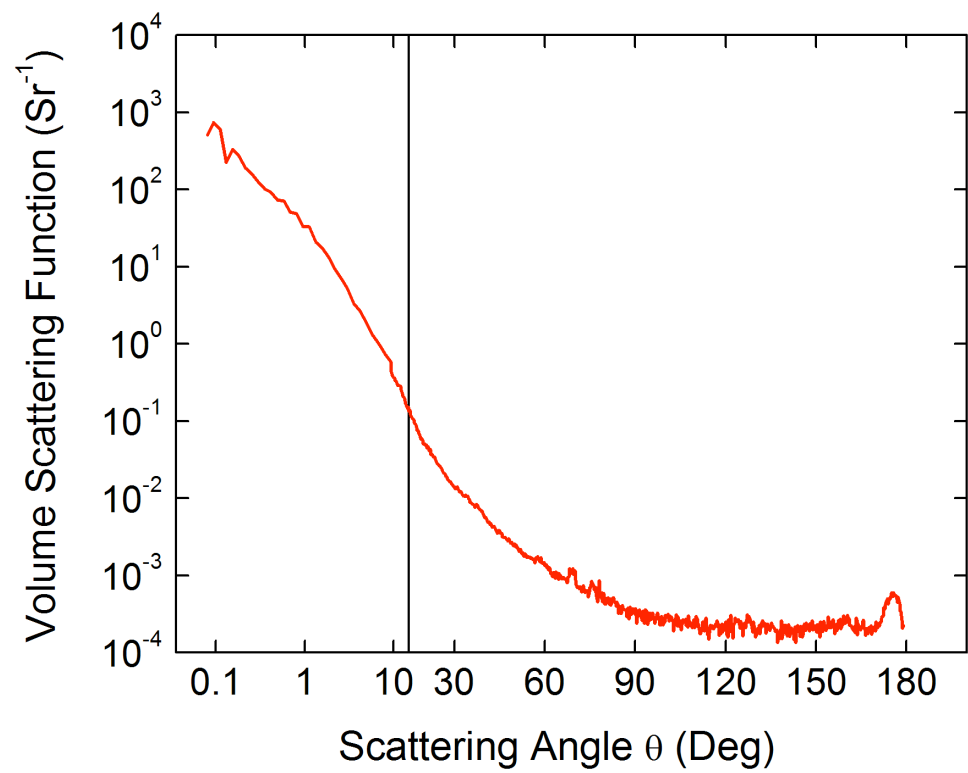
AC9 vs ASD Cast 50 – 30m (PRF2010292_45_corr.dat) CTD 10



TSS



MVSM

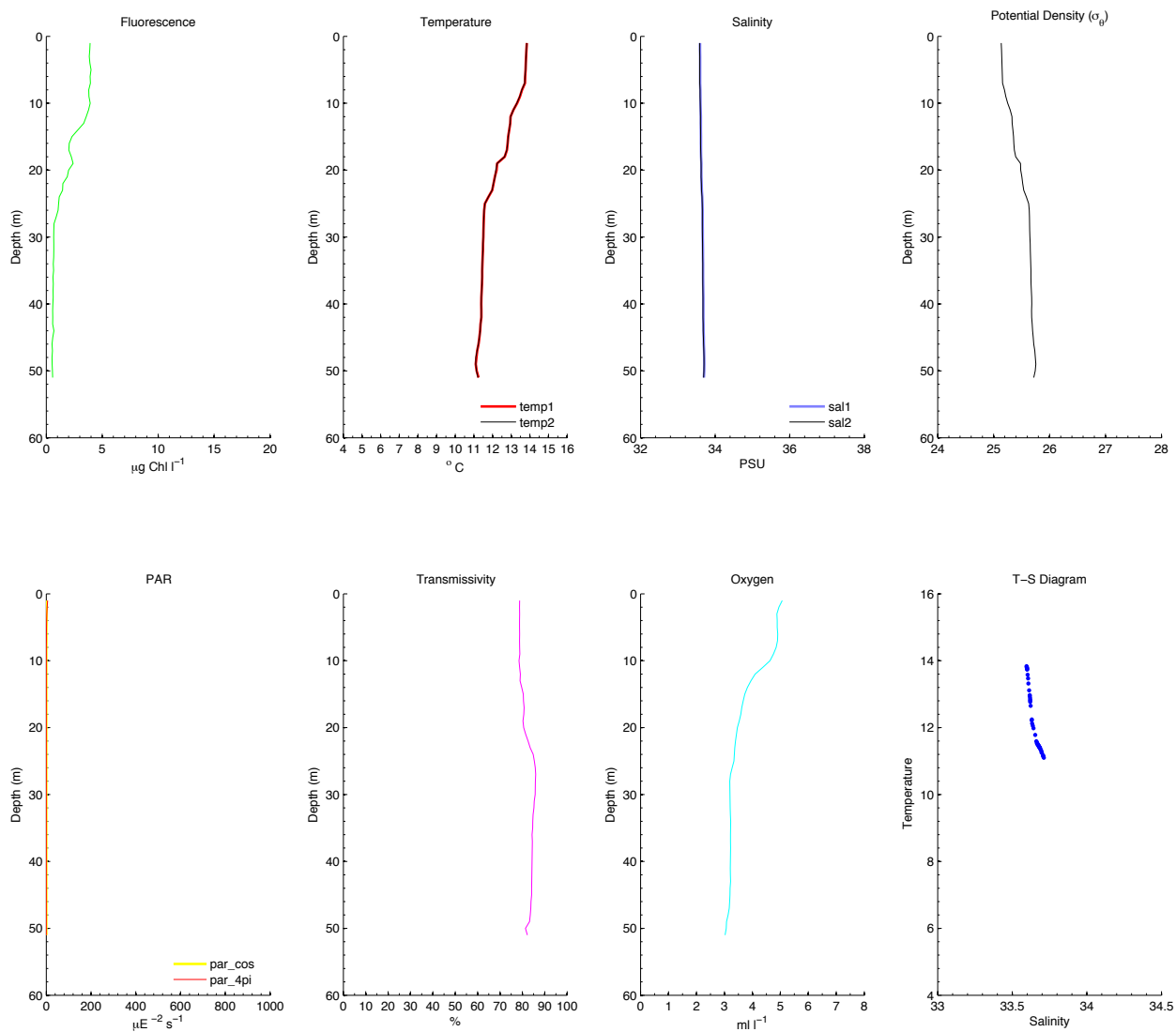


Cast 51 (1950 PDT; [Station BS13](#))

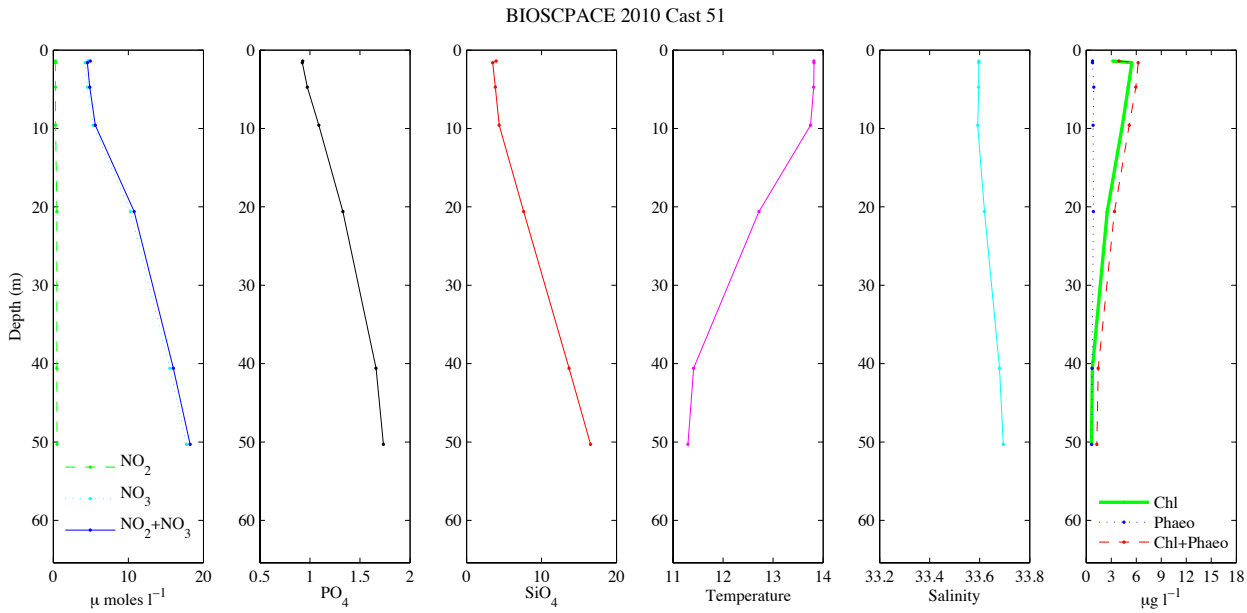
(plankton net back to the *Prorocentrum* bloom -high chlorophyll in MODIS imagery) (dark)

CTD

BIOSPACE 2010 Cast 51 (CTD13; 2010-10-19 02:50:00.000 UTC) CTD Downcast Data (Calibrated)

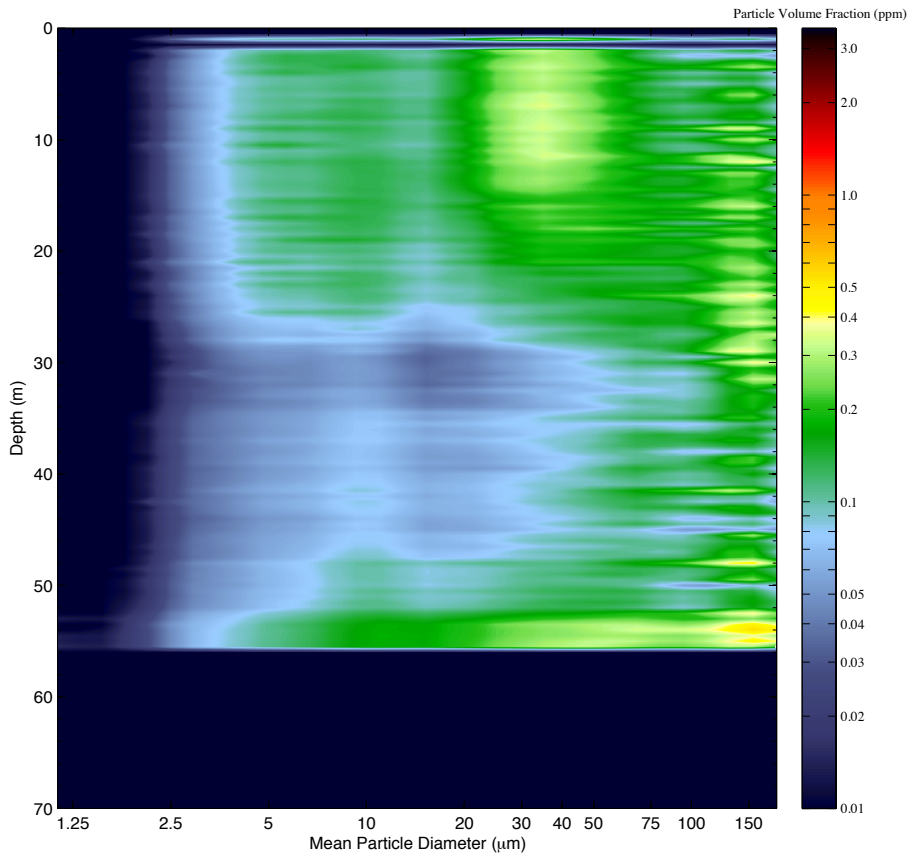


Bottle Nutrients and Chlorophyll

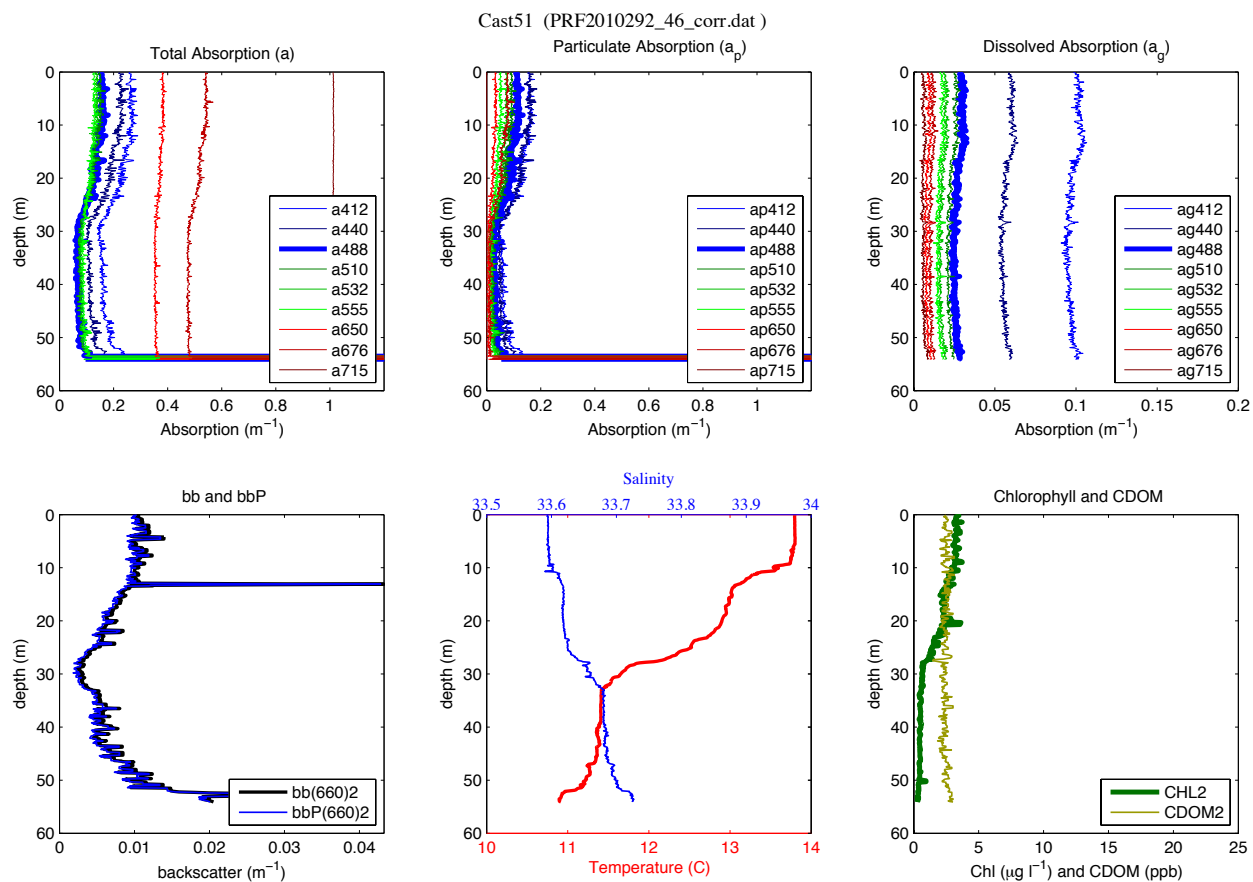


LISST

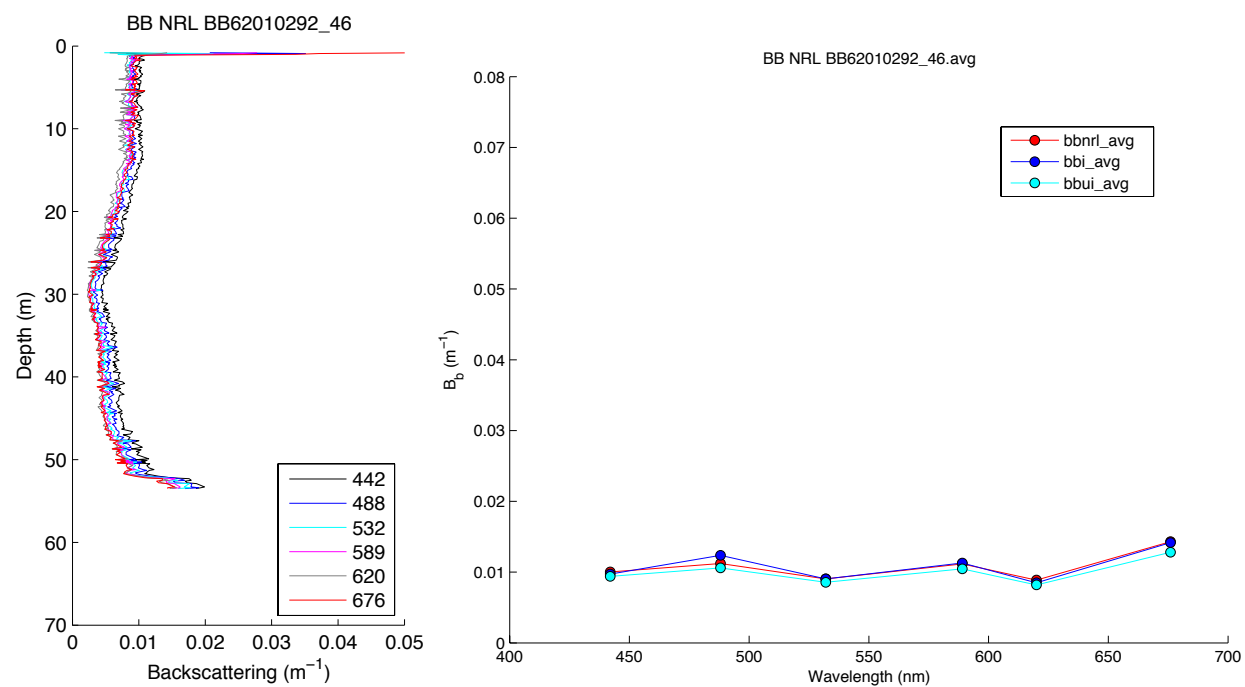
LISST – Cast 51



Optics Profile Package

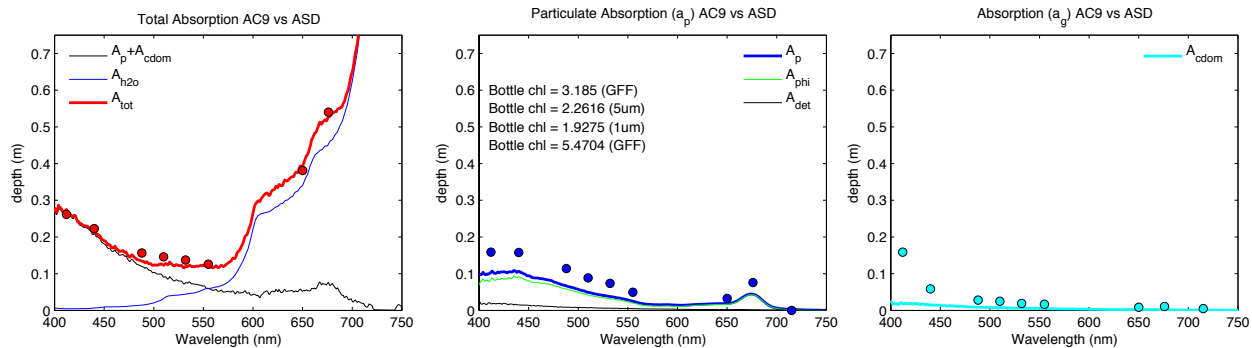


HydroScat

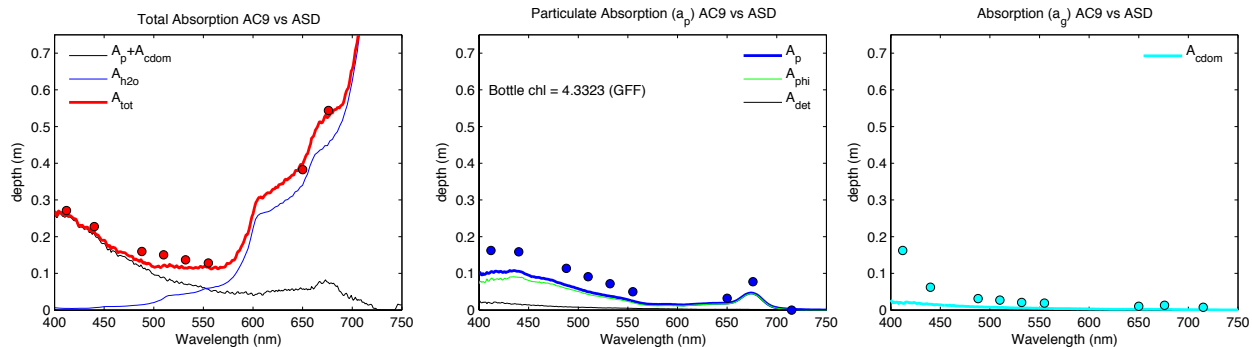


Filter Pad Absorption (w/ AC9)

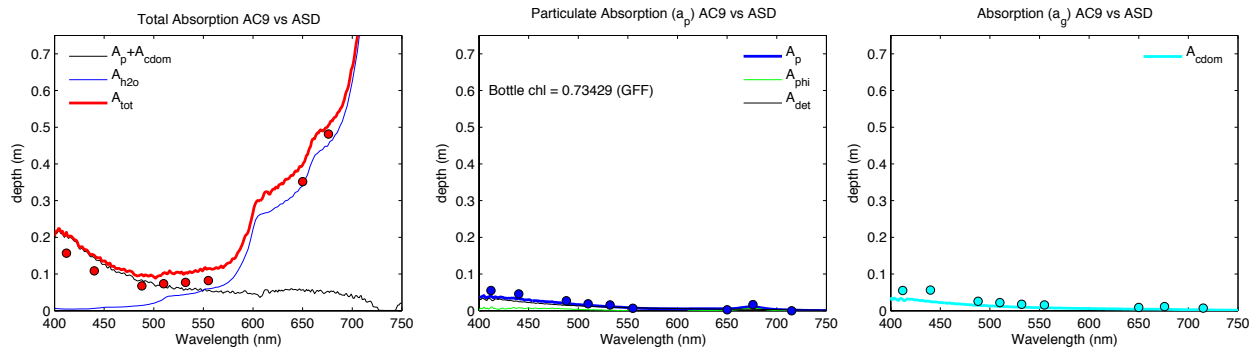
AC9 vs ASD Cast 51 – 0m (PRF2010292_46_corr.dat) CTD 11



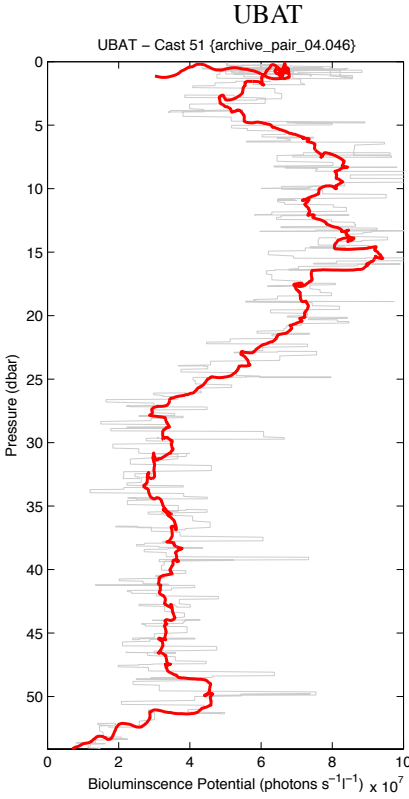
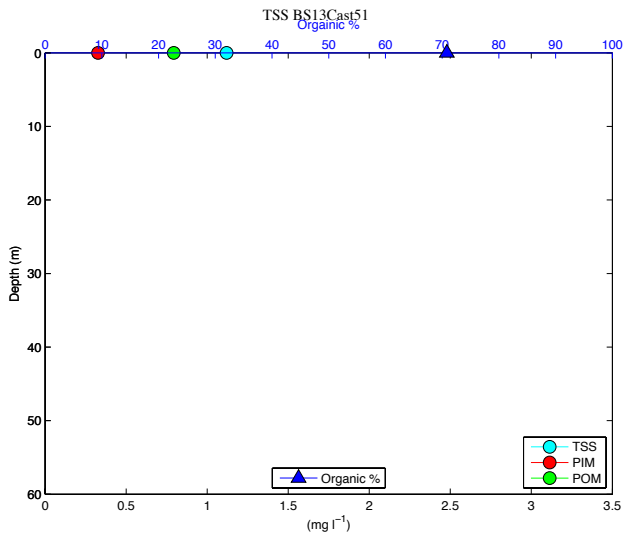
AC9 vs ASD Cast 51 – 10m (PRF2010292_46_corr.dat) CTD 11



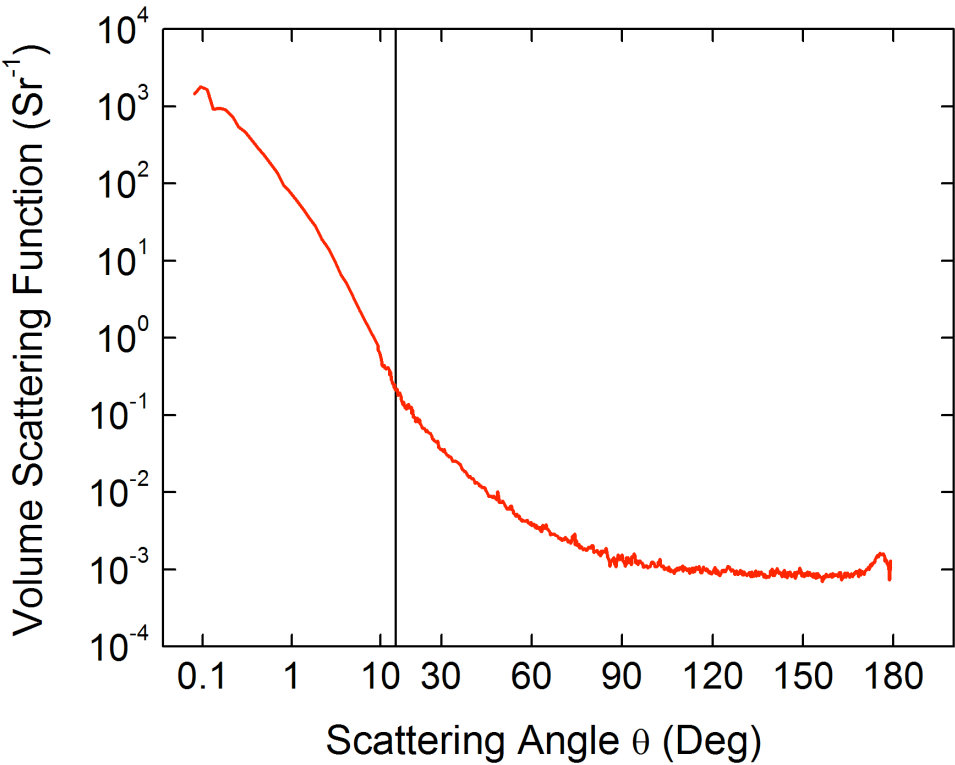
AC9 vs ASD Cast 51 – 40m (PRF2010292_46_corr.dat) CTD 11



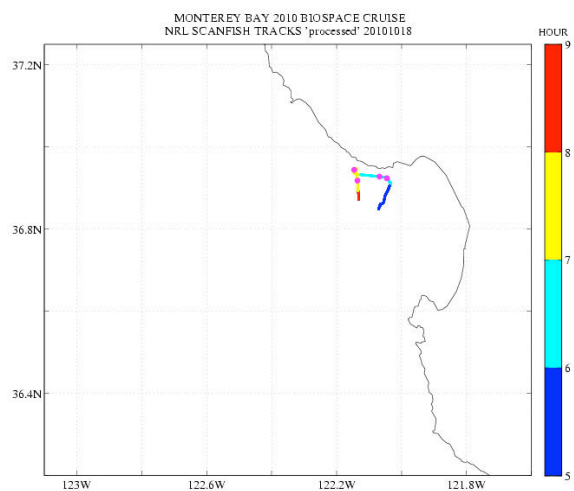
TSS



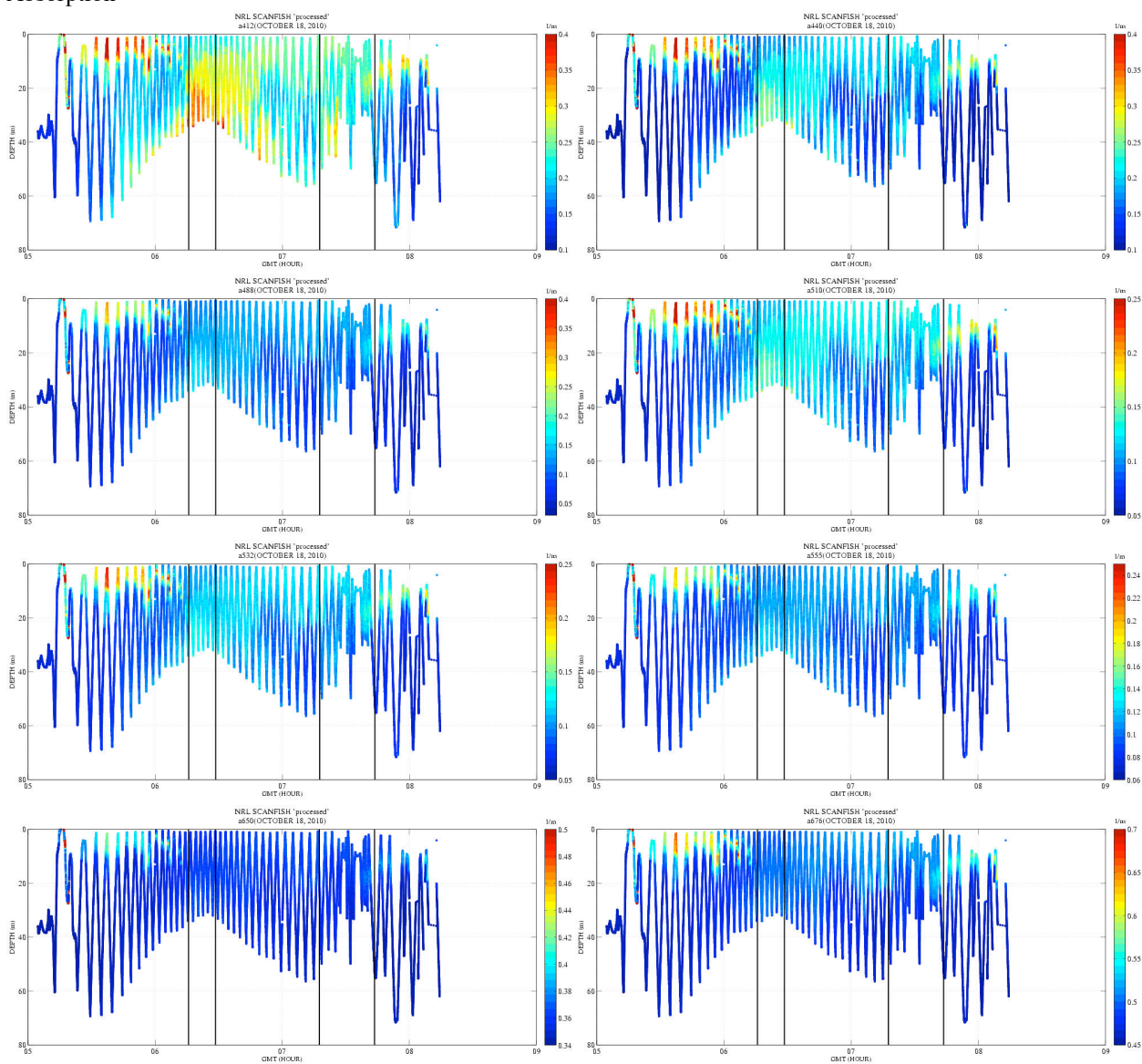
MVSM

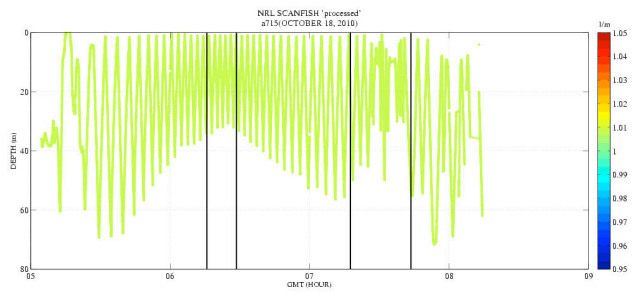


Scanfish Survey

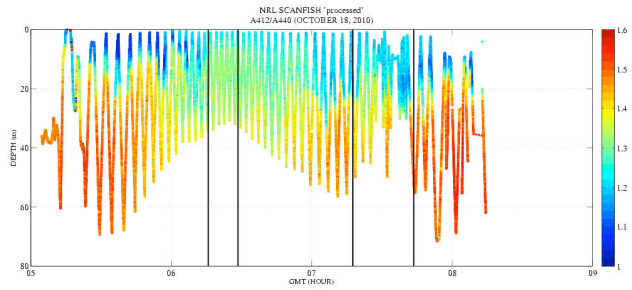


Absorption

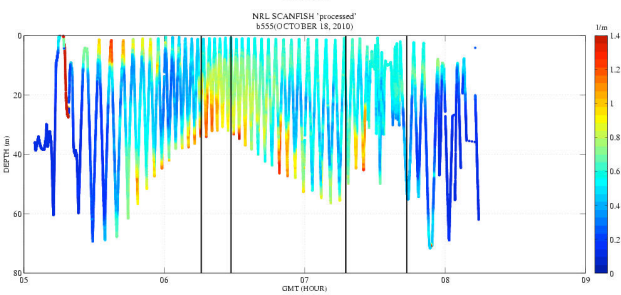
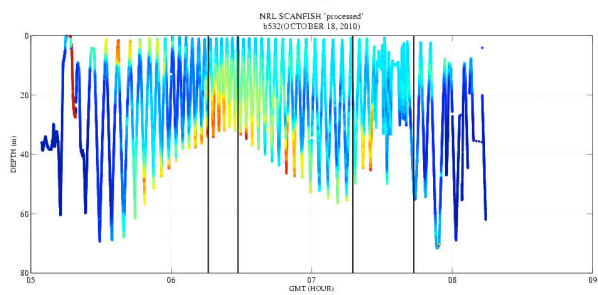
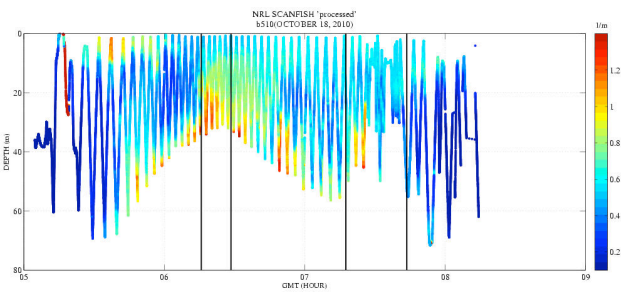
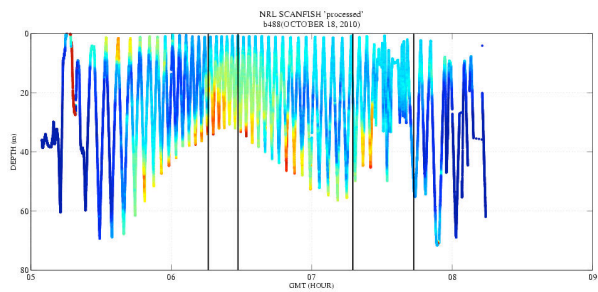
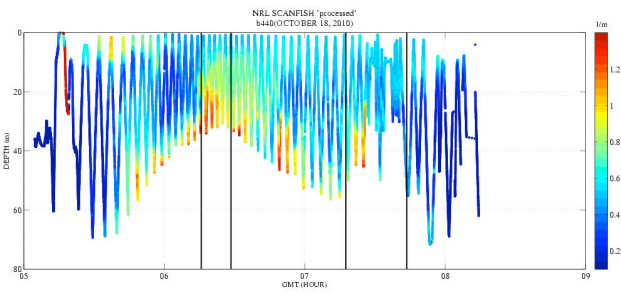
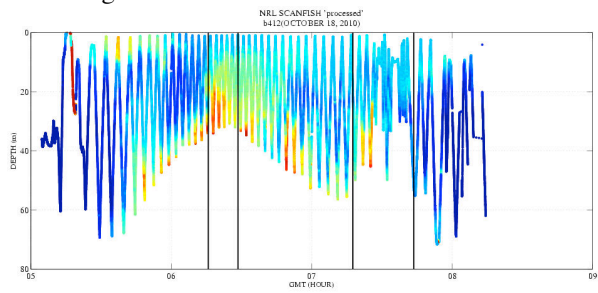


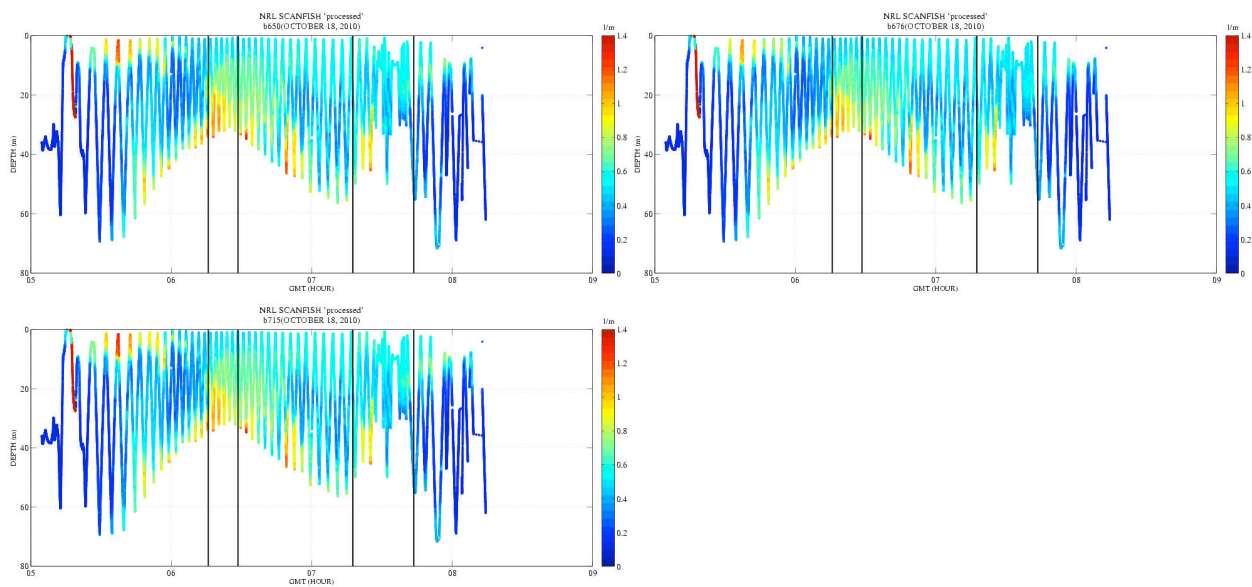


A412:A440

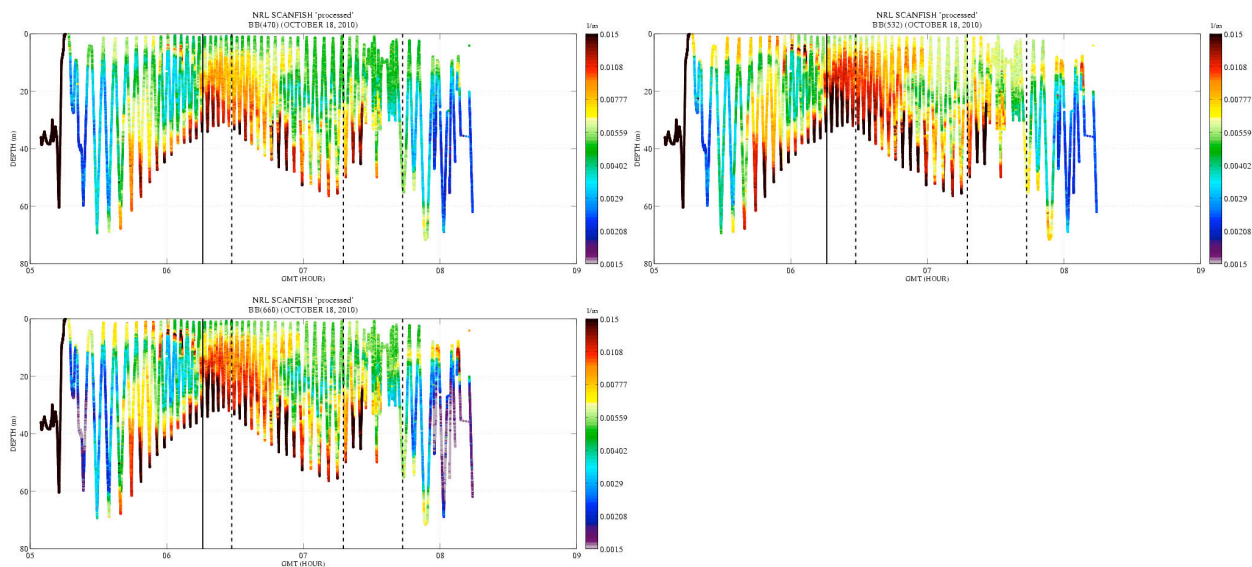


Scattering

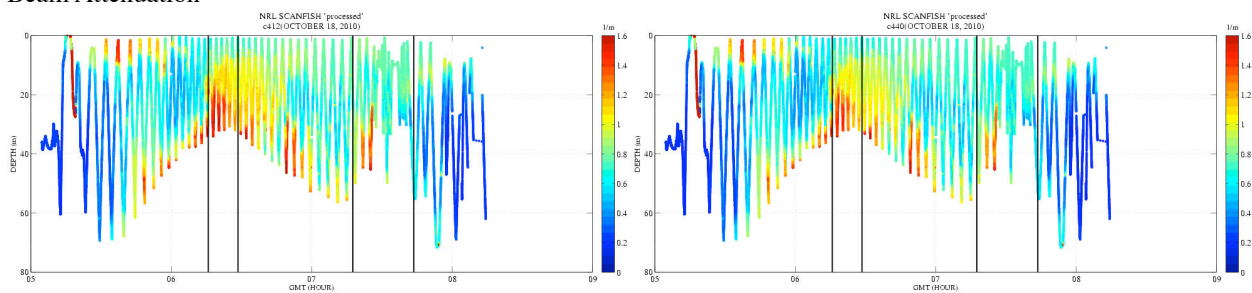


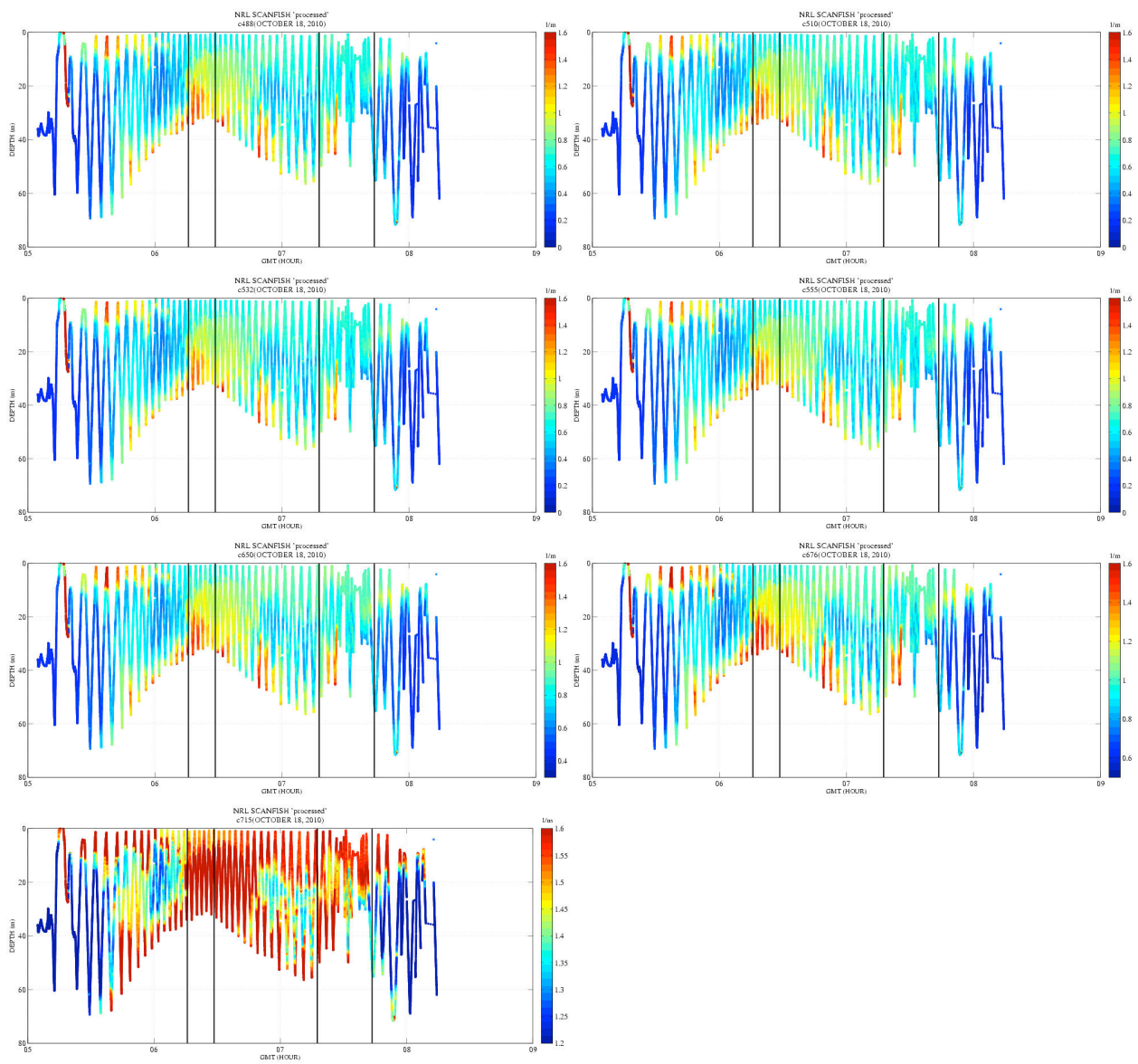


Backscatter

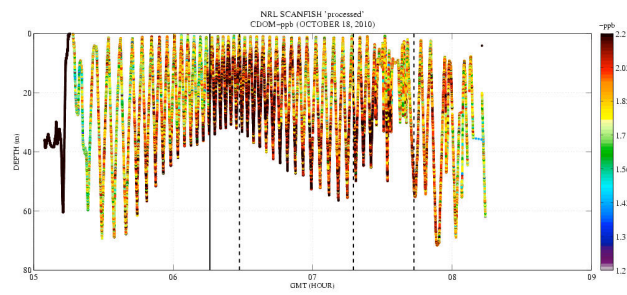


Beam Attenuation

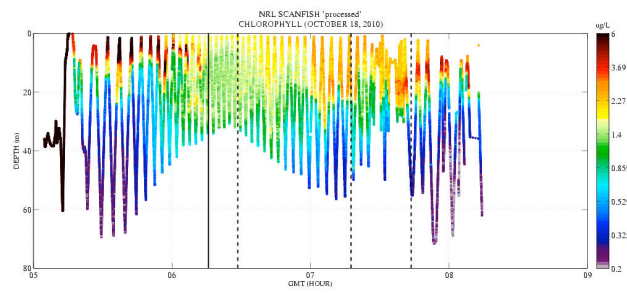




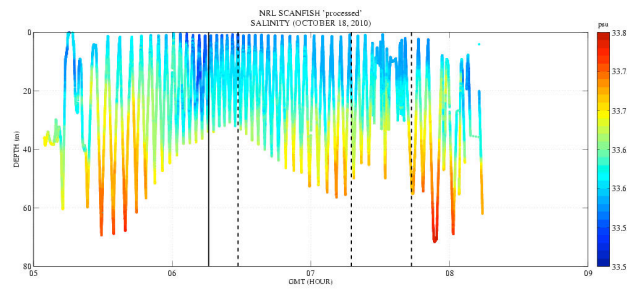
CDOM



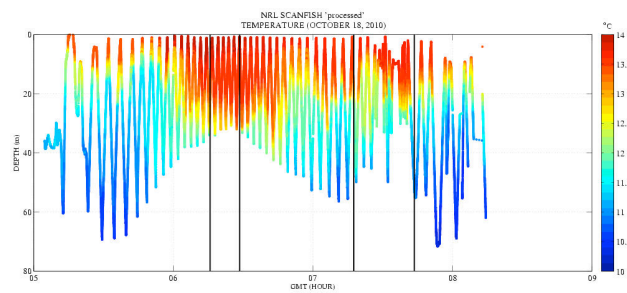
Chlorophyll



Salinity



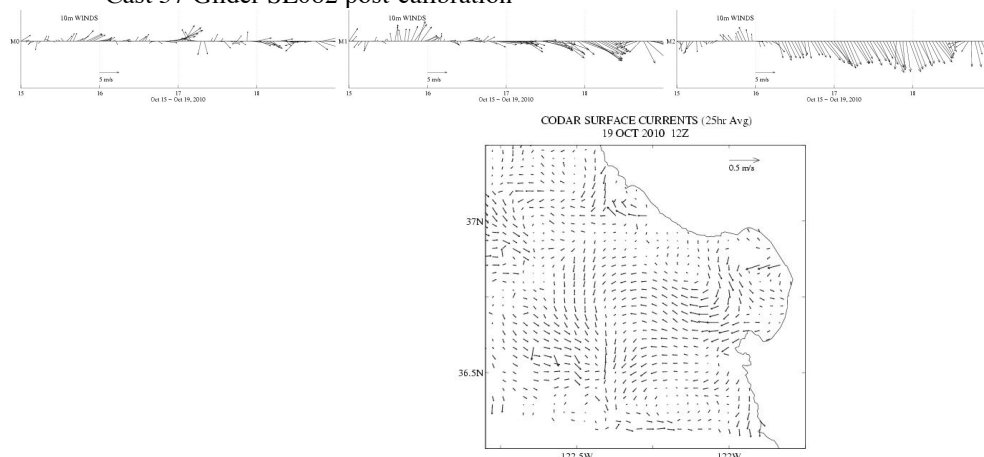
Temperature



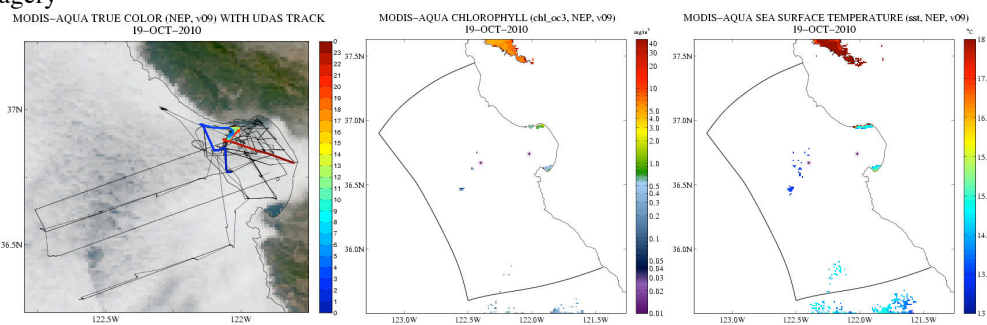
10/19

Casts 52-56 all at [station 5](#) - Dino timeseries 2 off Santa Cruz

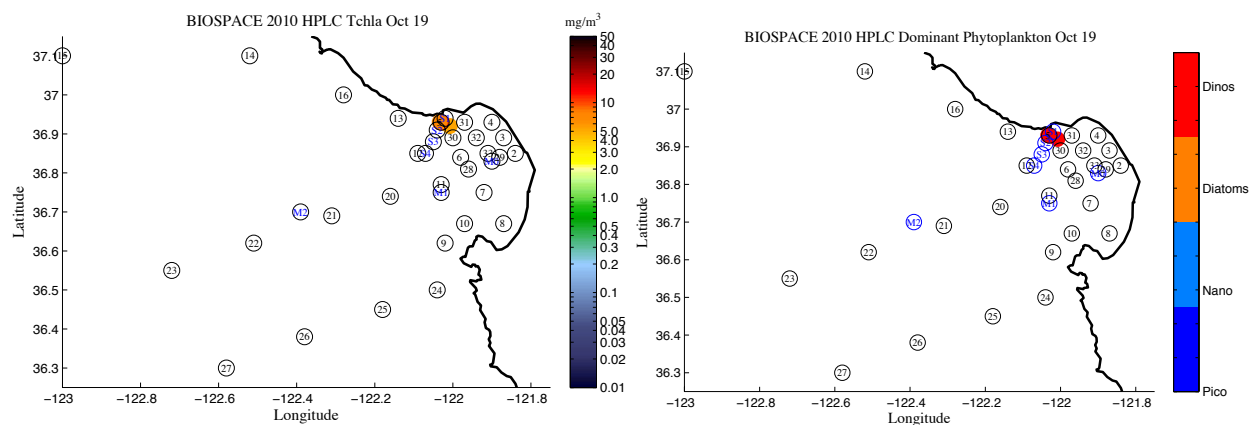
Cast 57 Glider SL082 post-calibration



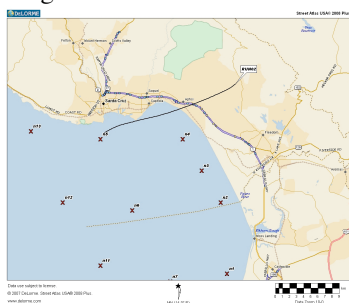
Satellite Imagery



HPLC



Aircraft Flight-lines



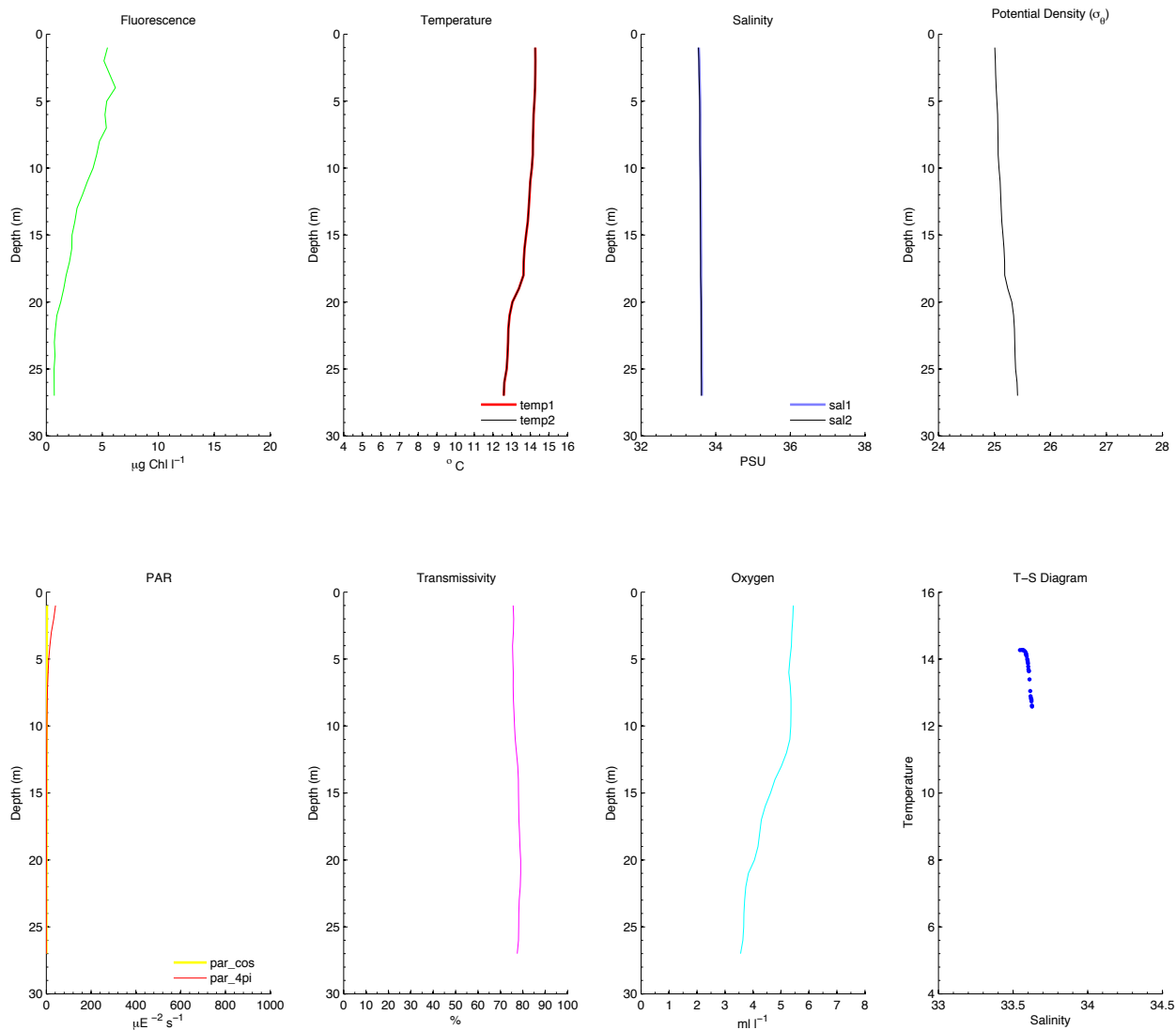
PHILLS Caption: Very foggy day. Couldn't leave airfield until 13:00. PT Sur was in North part of Bay, but it was too cloudy/foggy to make any measurements. When we got to the ship area, the ship had already left the area and conditions were too bad to make any measurements. At this point, we went inland where the sky was sunny and clear and made BRDF observations of the salt flats near Moffet Field near San Diego. PHILLS data not taken (and lines not shown) for SWIR data over land at end of flight. Inadvertently entered wrong scan rate (1.8 instead of 0.9 degrees/sec). This should have no ill effect on the measurements but pixels will not be square. They will be approximately twice as wide as they are long. Observations also made in Tracking Mode.

Cast 52 (0800 PDT; [Station BS05](#))

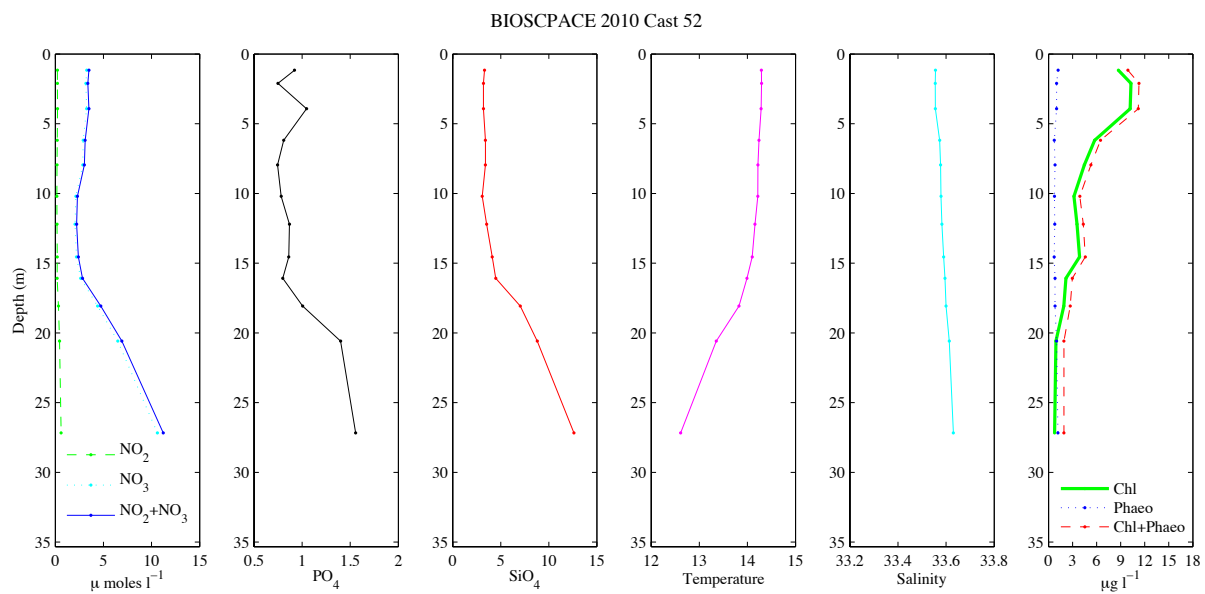
(plantkton net: *Prorocentrum* bloom. Start of time series B, bottles at 27 m then every 2 meters to the surface. FCMG samples (for flow-cytometer) taken from all bottles.) (dinoflagellates) (foggy)

CTD

BIOSPACE 2010 Cast 52 (CTD05; 2010-10-19 15:02:00.000 UTC) CTD Downcast Data (Calibrated)

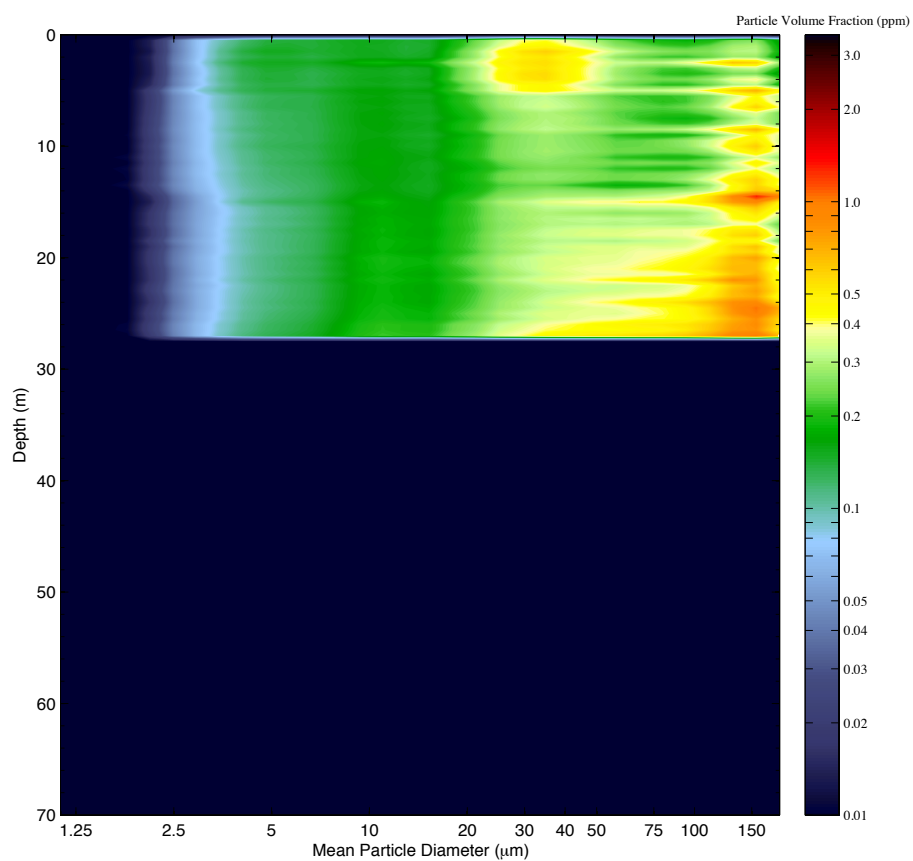


Bottle Nutrients and Chlorophyll

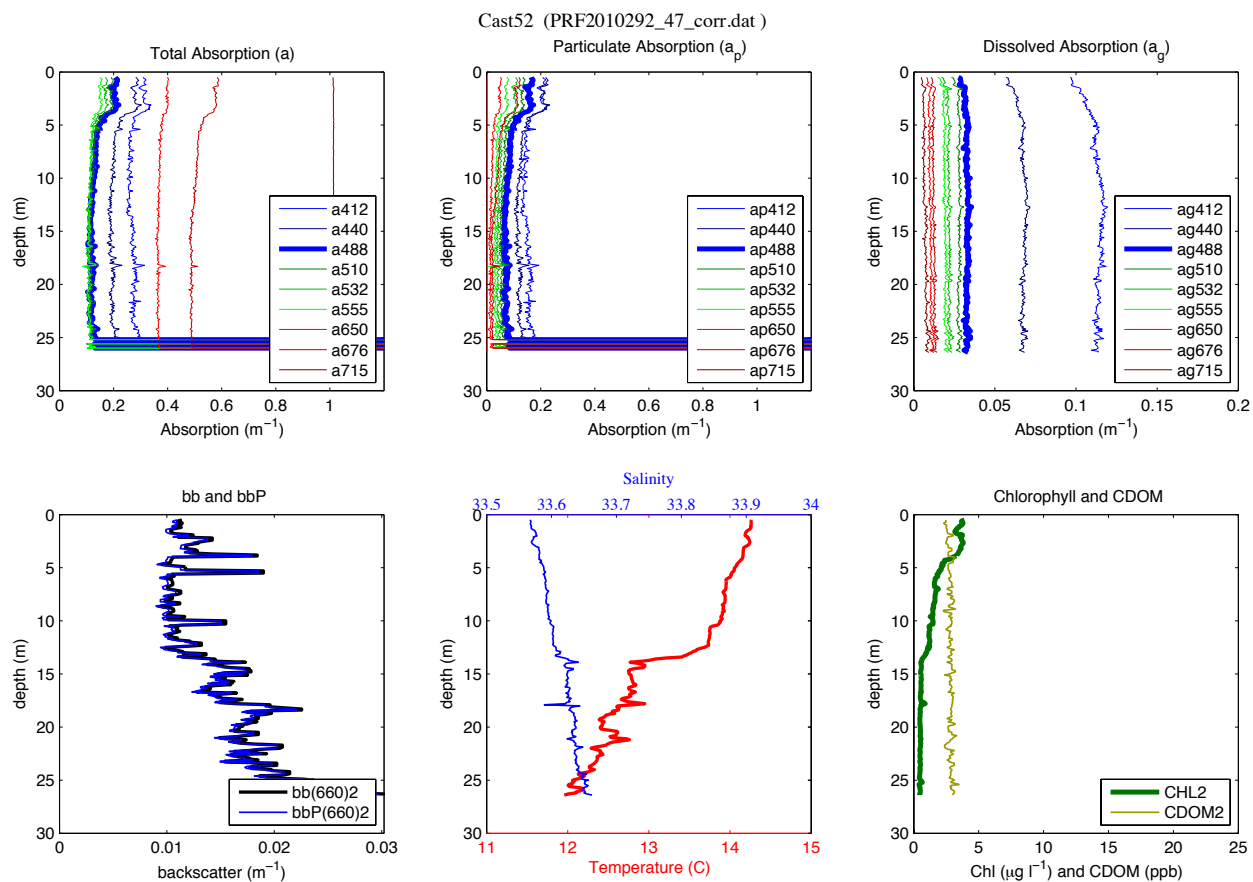


LISST

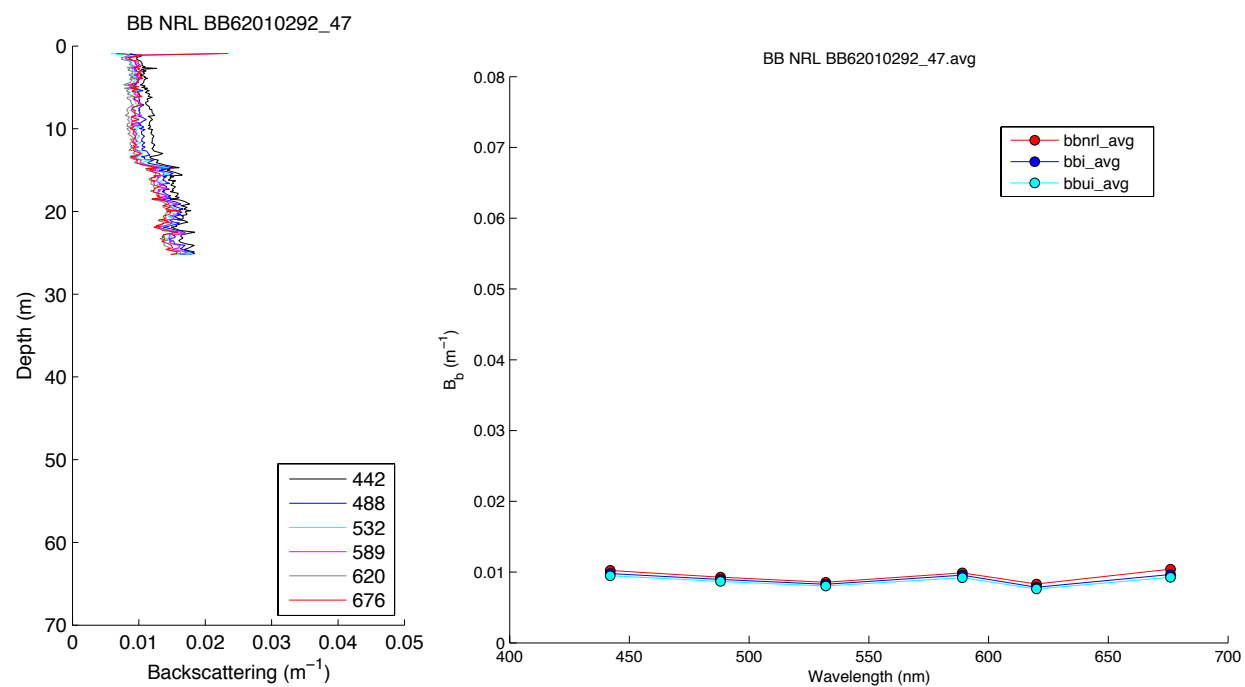
LISST – Cast 52



Optics Profile Package

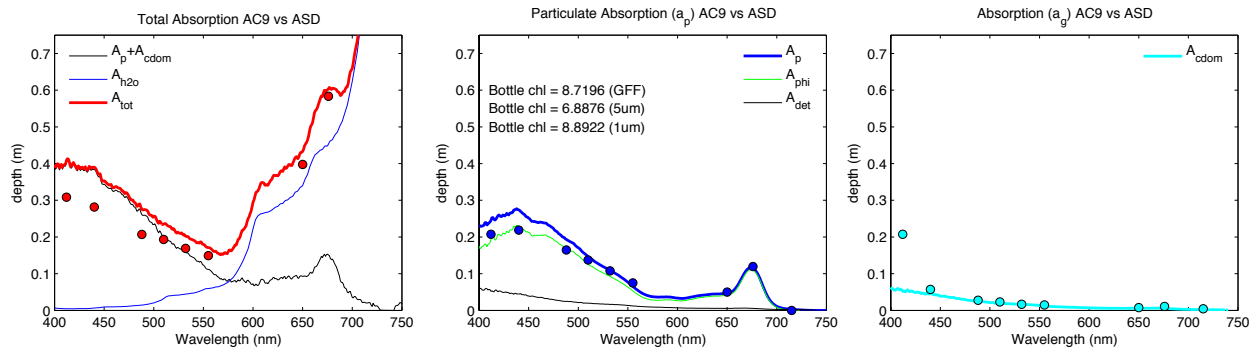


HydroScat

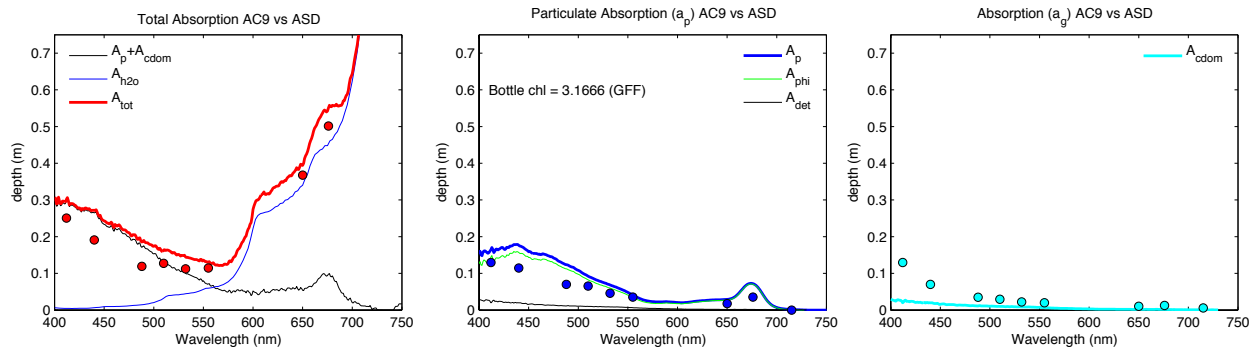


Filter Pad Absorption (w/ AC9)

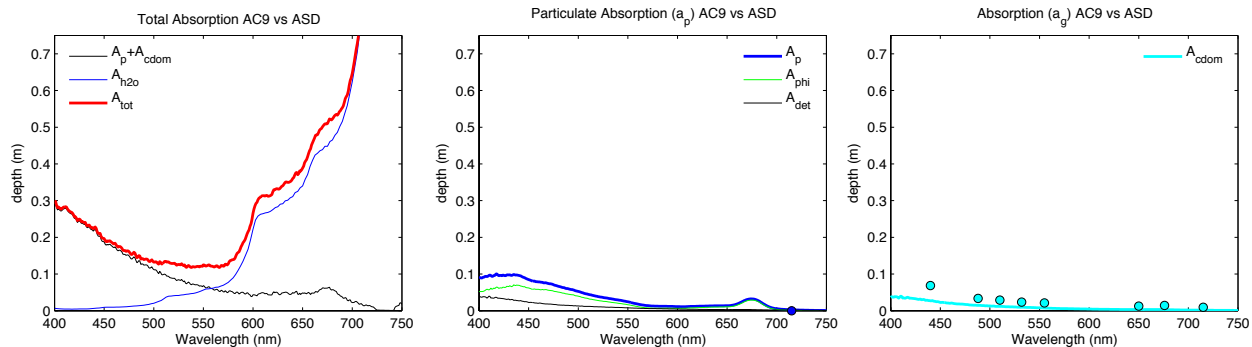
AC9 vs ASD Cast 52 – 0m (PRF2010292_47_corr.dat) CTD 12



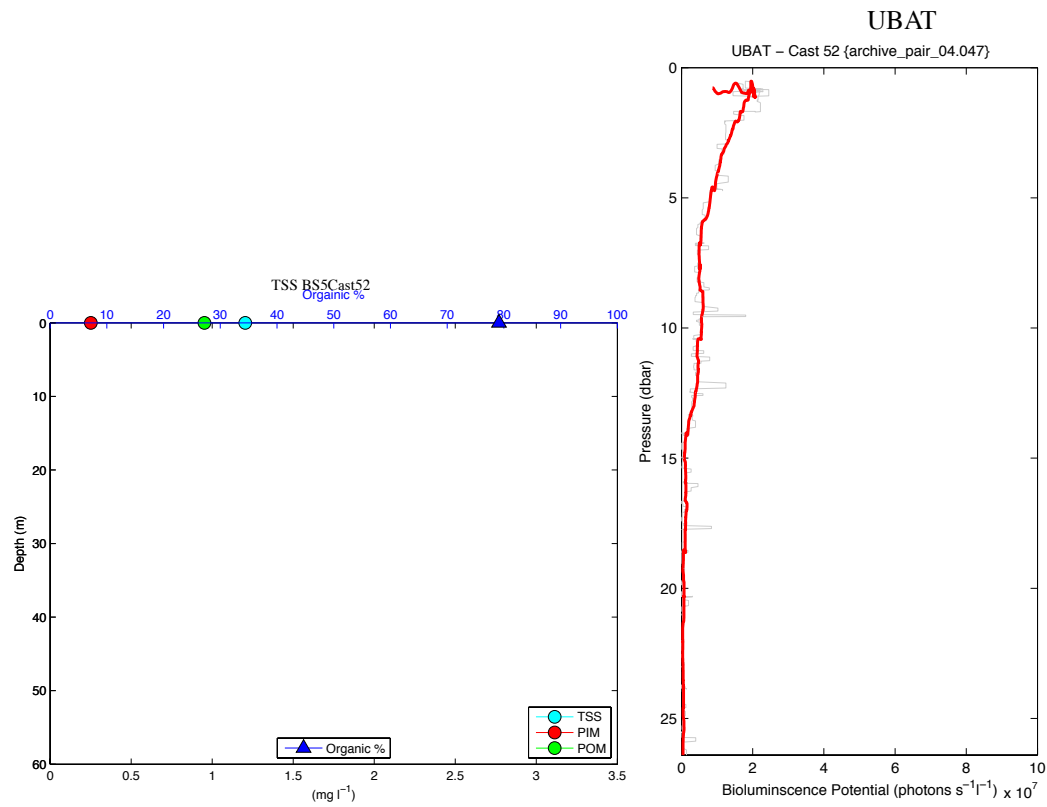
AC9 vs ASD Cast 52 – 10m (PRF2010292_47_corr.dat) CTD 12



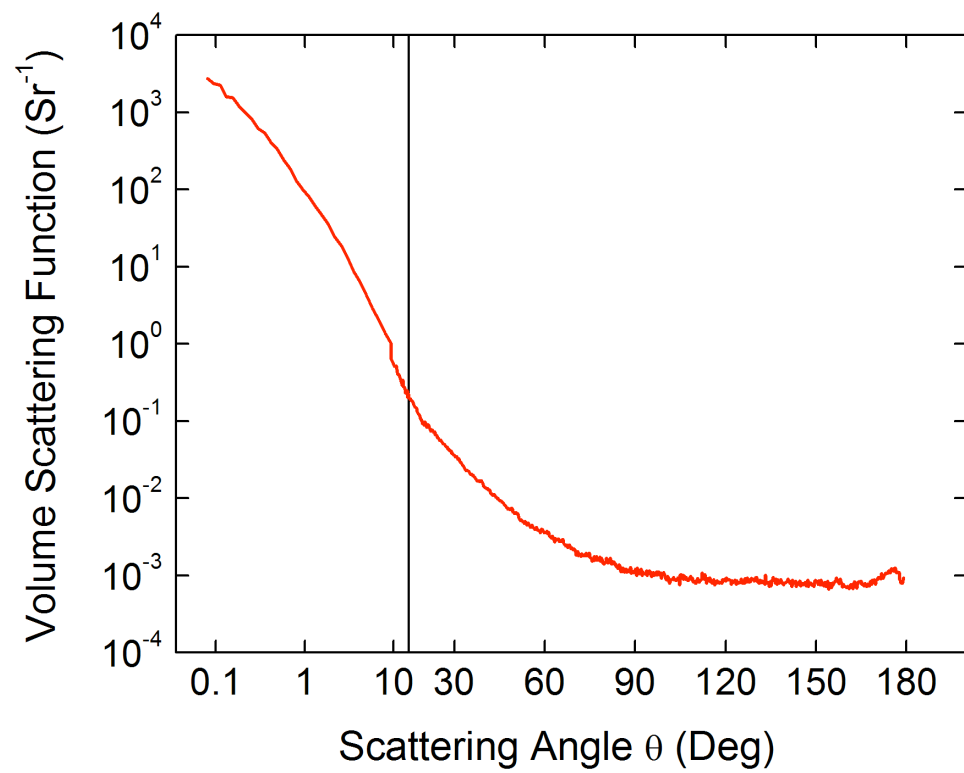
AC9 vs ASD Cast 52 – 40m (PRF2010292_47_corr.dat) CTD 12



TSS



MVSM

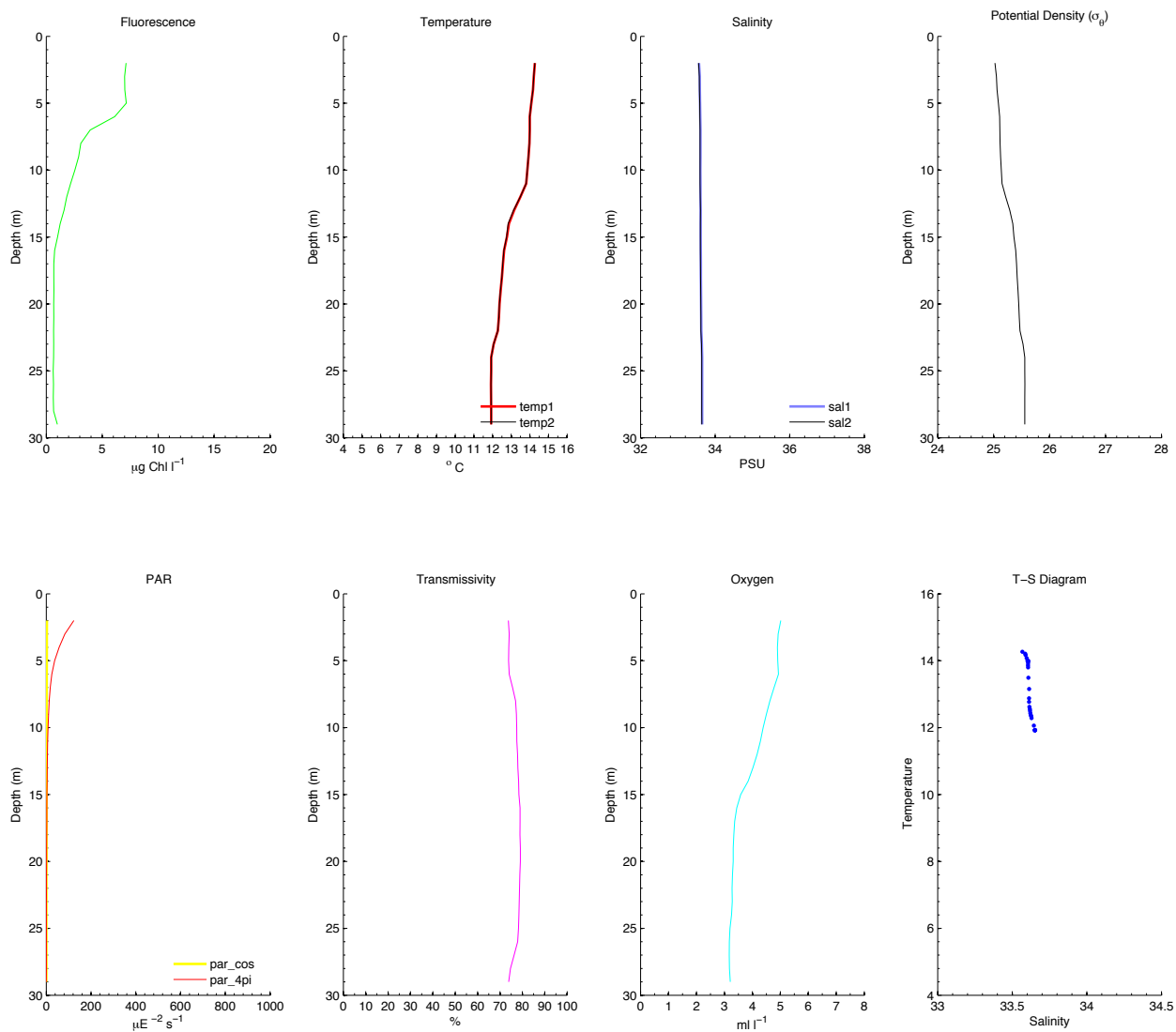


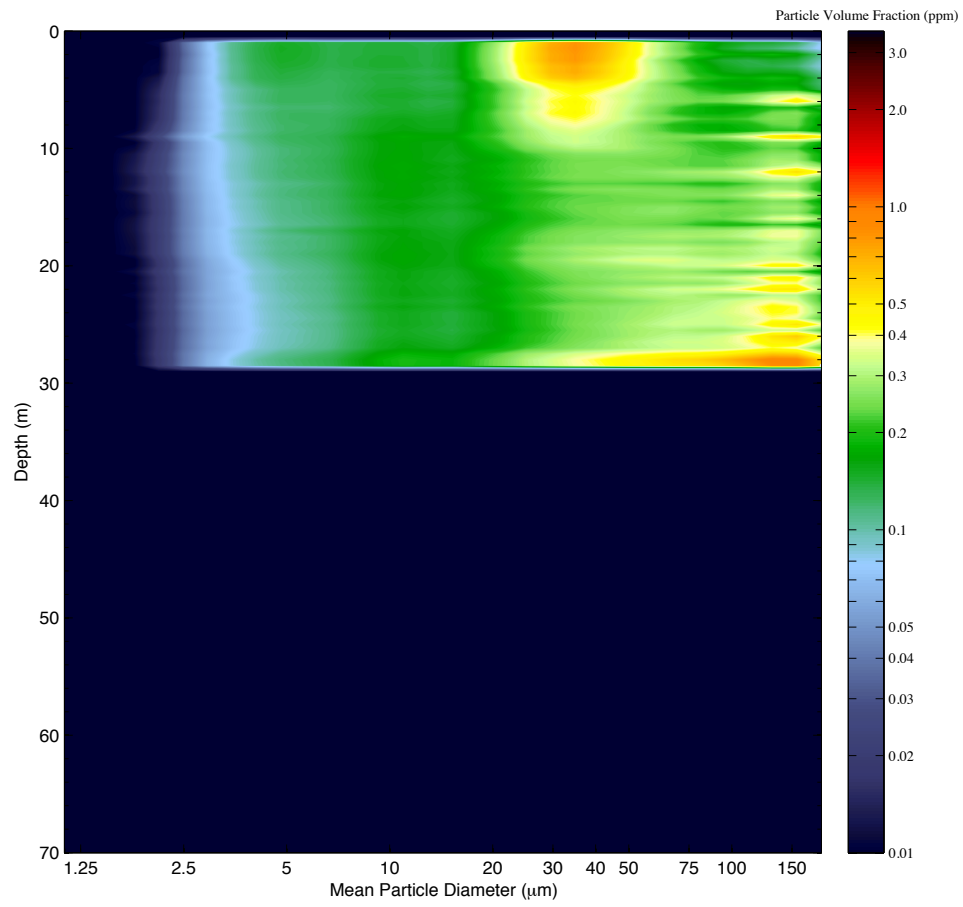
Cast 53 (0900 PDT; [Station BS05](#))

(CTD and optics cast only - no bottles) (foggy)

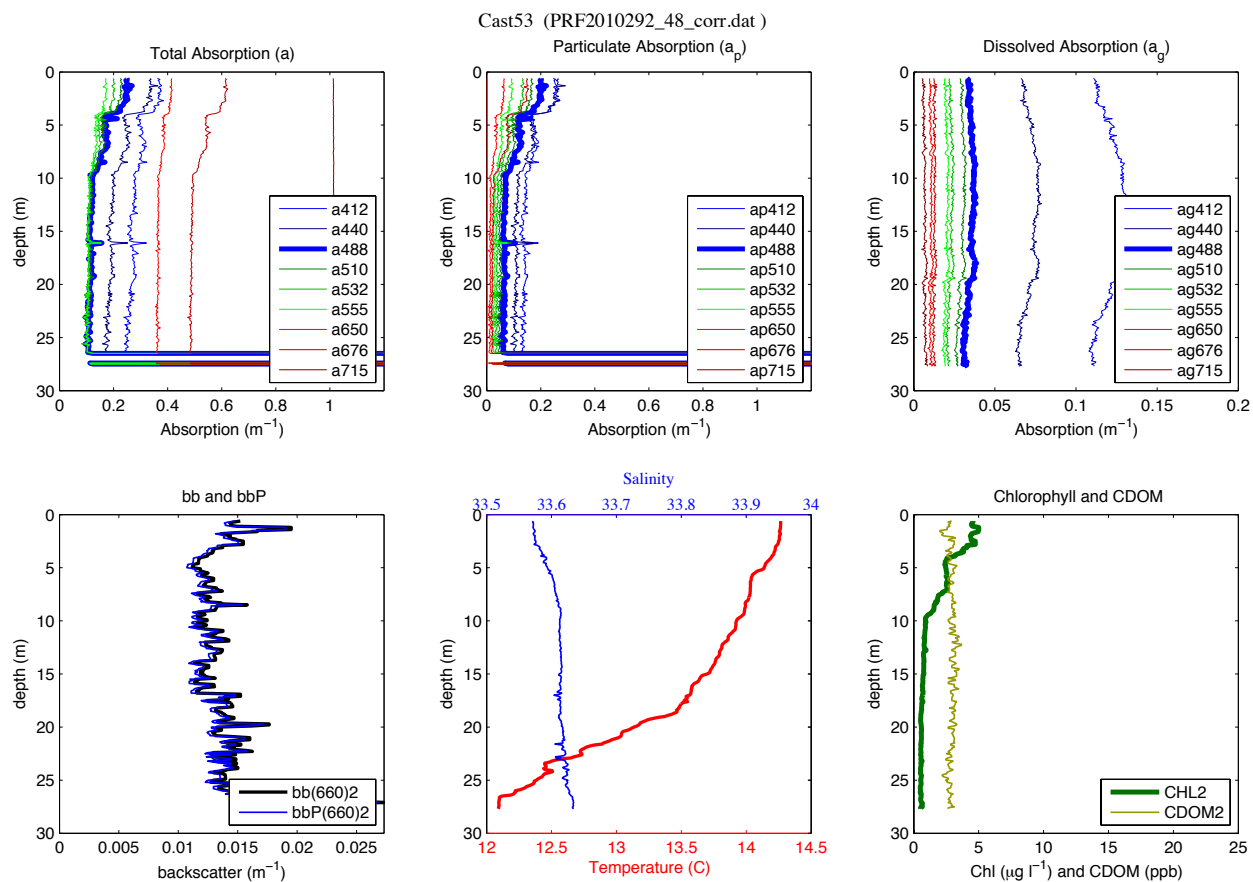
CTD

BIOSPACE 2010 Cast 53 (CTD05; 2010-10-19 16:04:20.000 UTC) CTD Downcast Data (Calibrated)

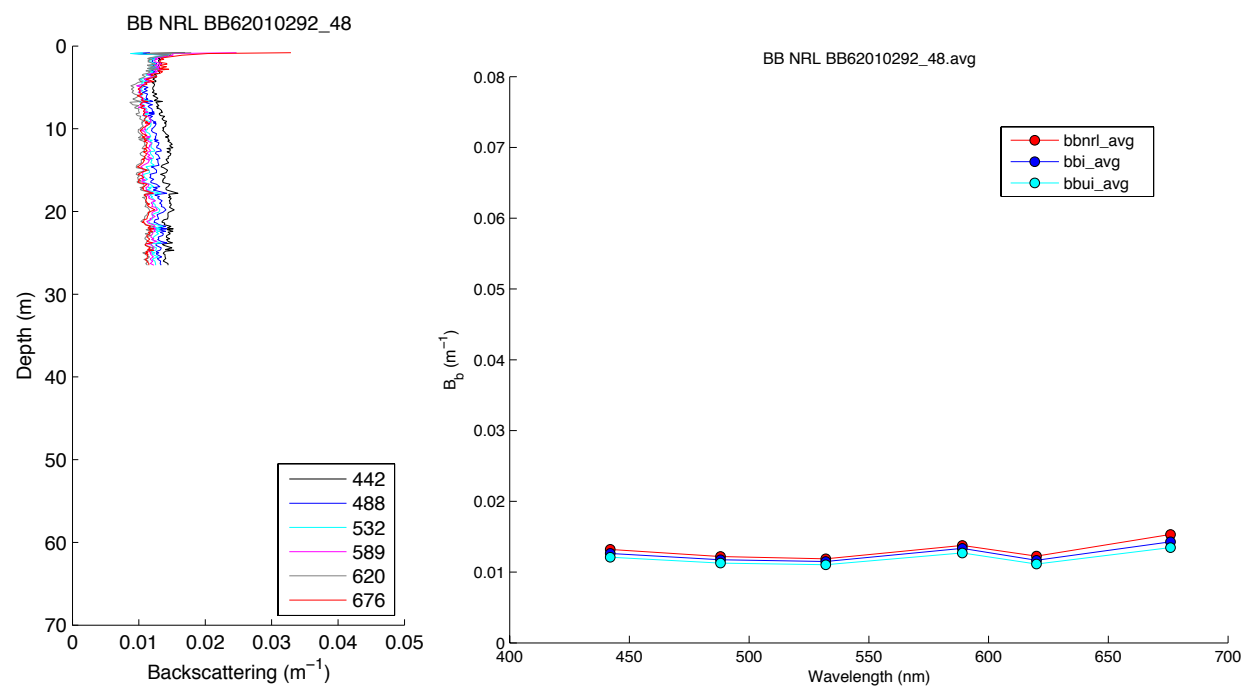




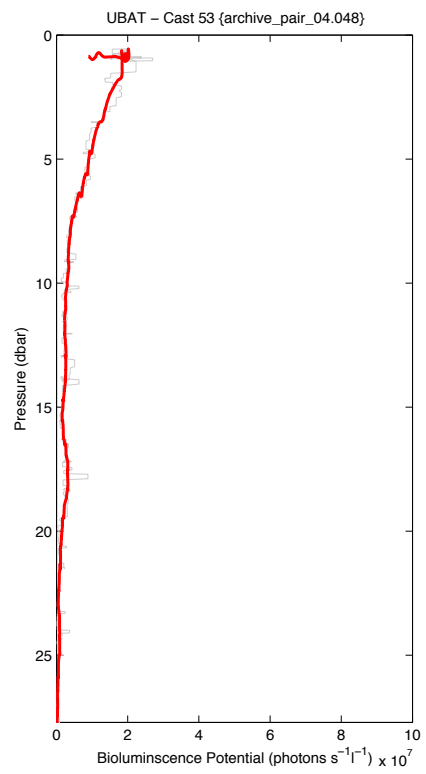
Optics Profile Package



HydroScat



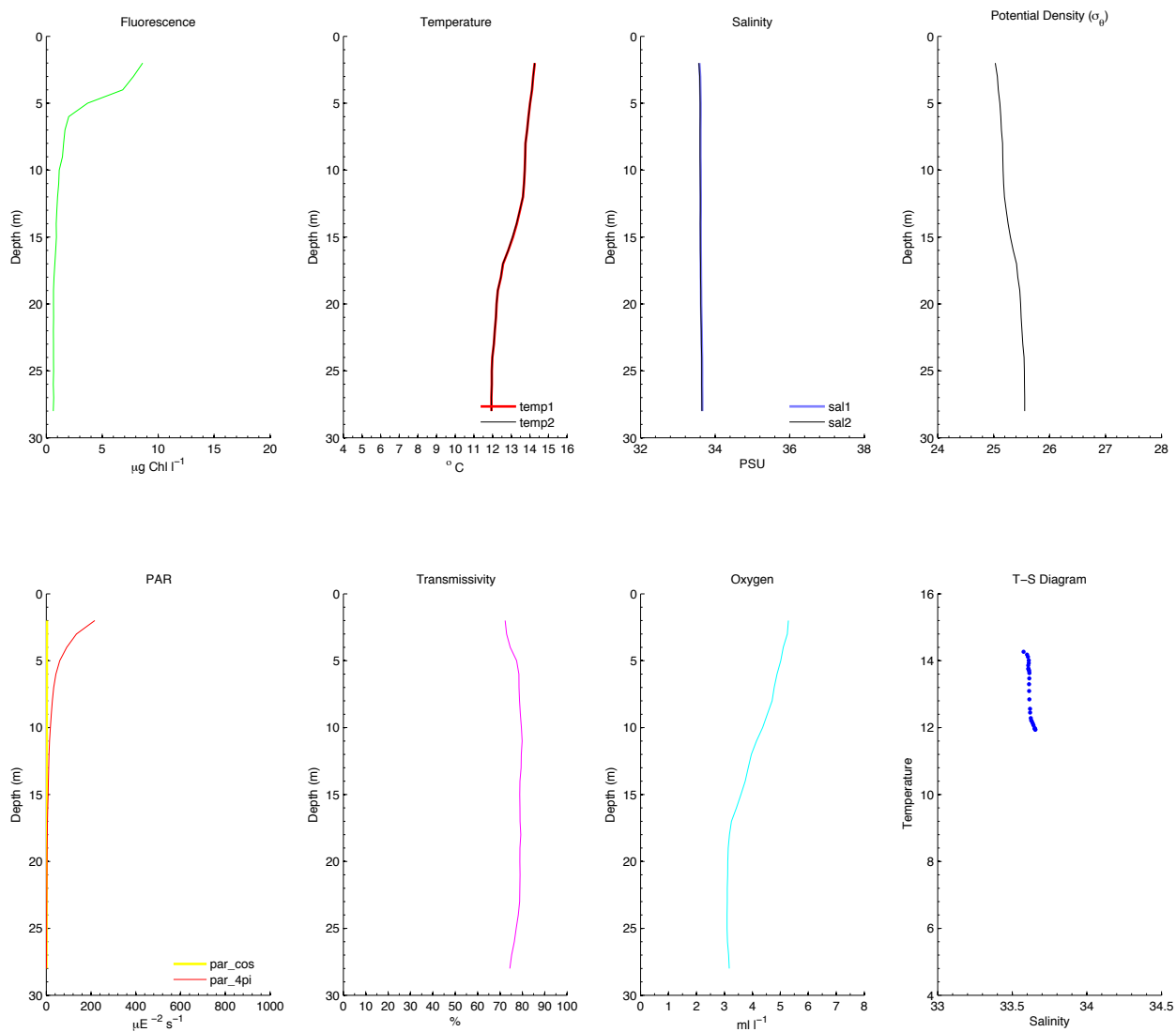
UBAT



Cast 54 (1000 PDT; [Station BS05](#))
(Bloom at surface) (foggy)

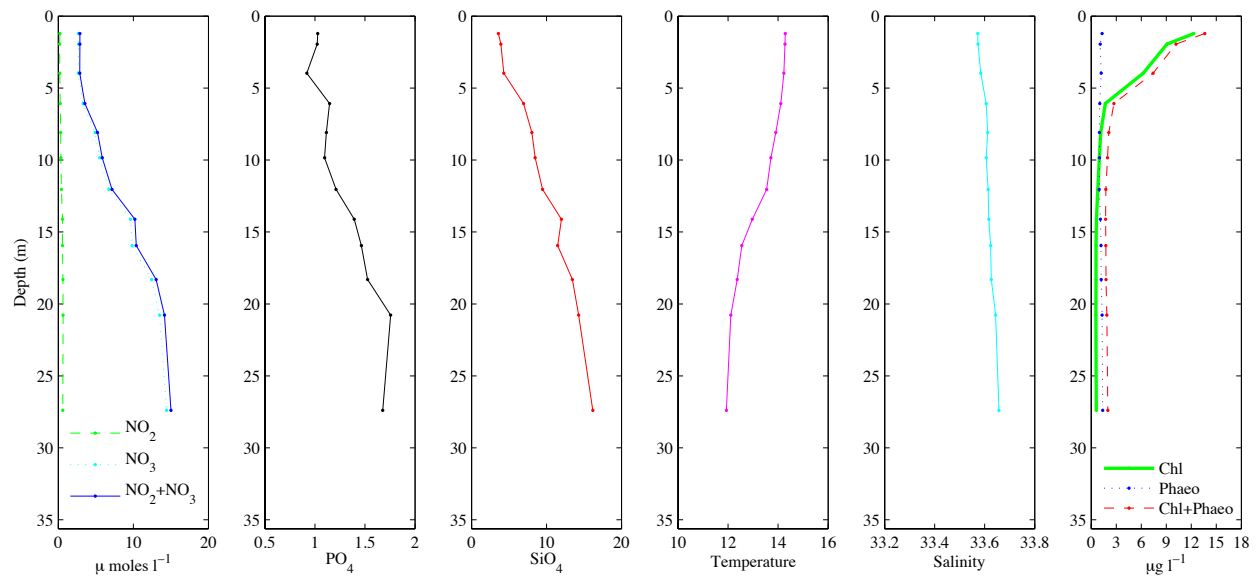
CTD

BIOSPACE 2010 Cast 54 (CTD05; 2010-10-19 17:02:00.000 UTC) CTD Downcast Data (Calibrated)



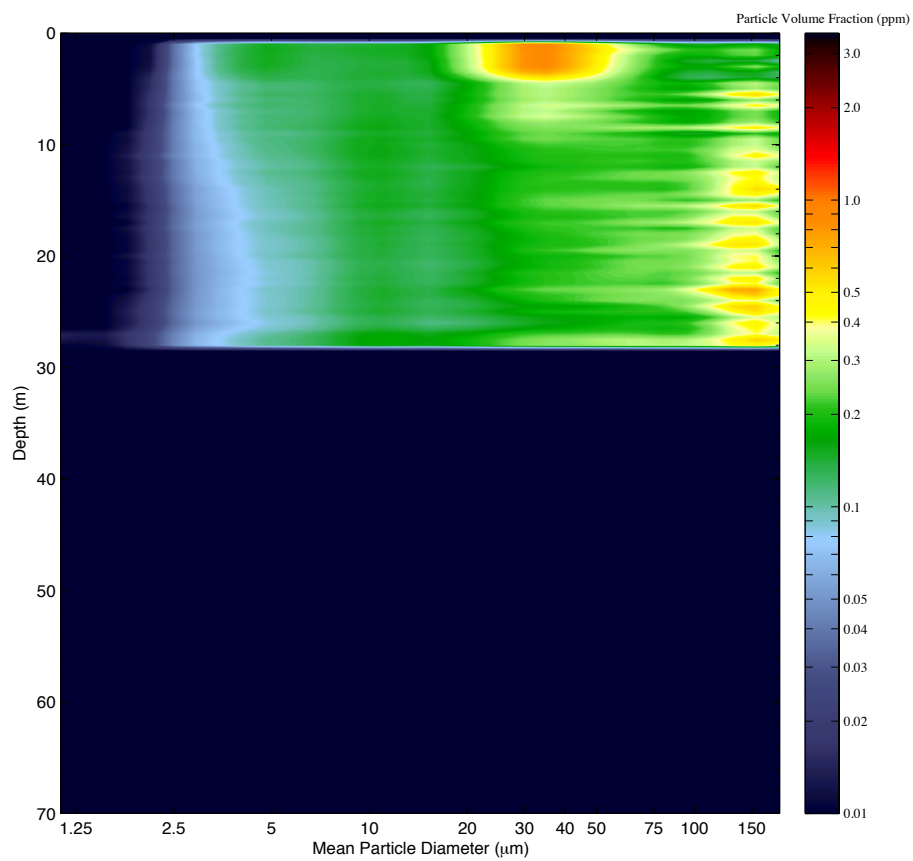
Bottle Nutrients and Chlorophyll

BIOSPACE 2010 Cast 54

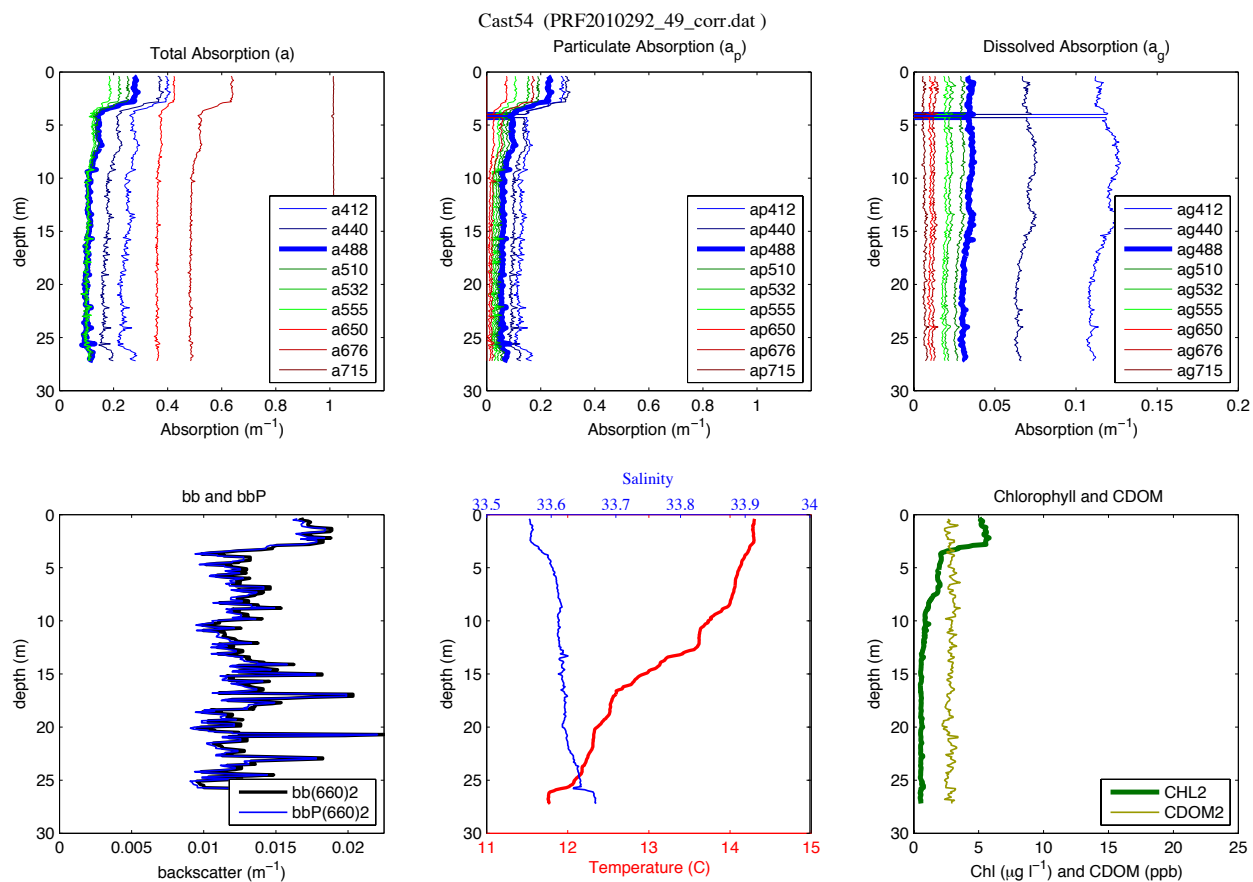


LISST

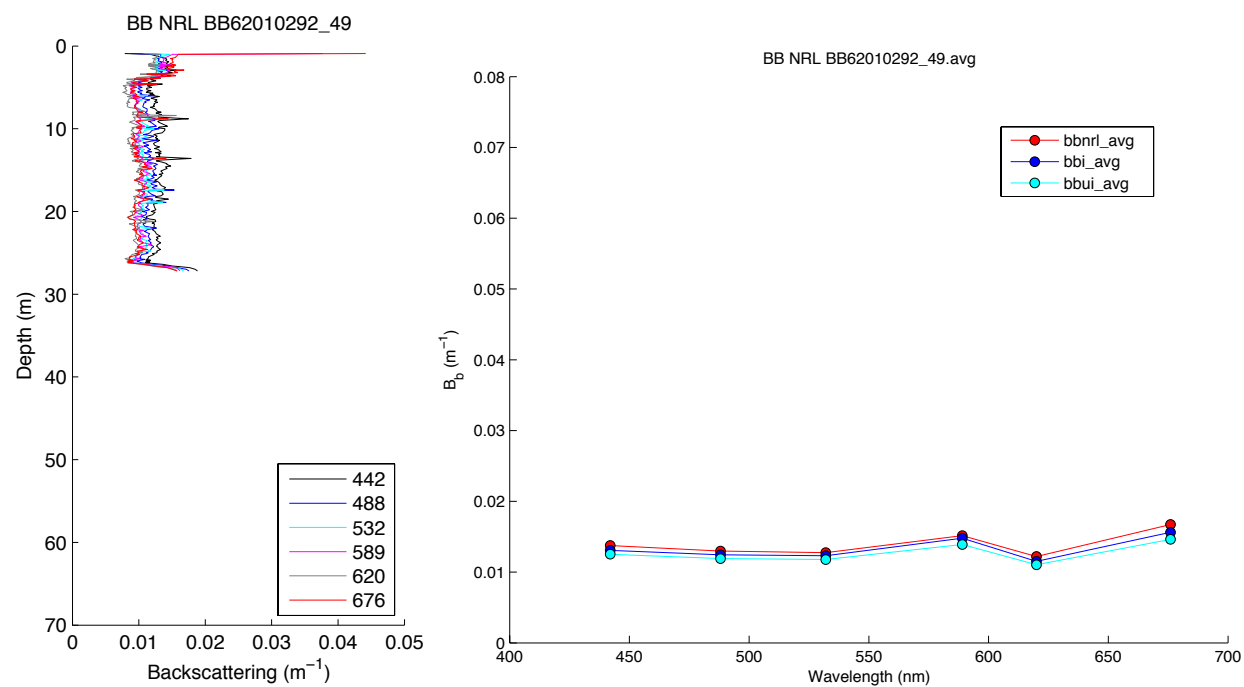
LISST – Cast 54



Optics Profile Package

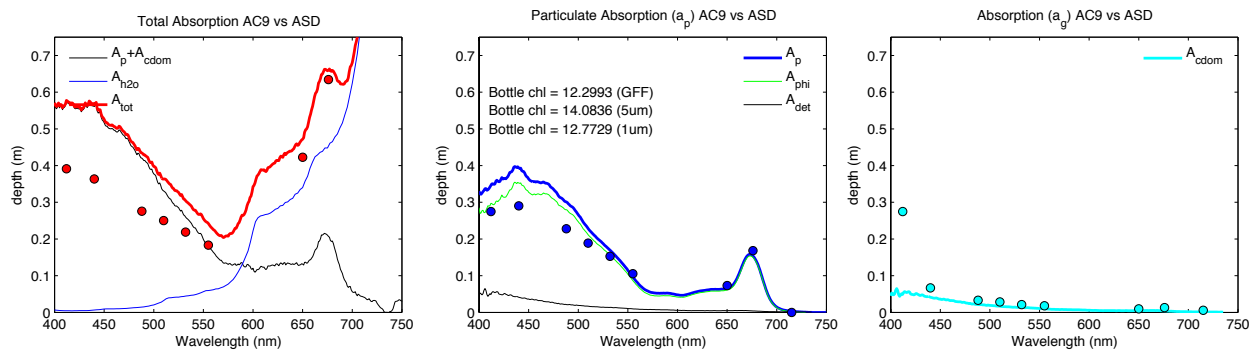


HydroScat

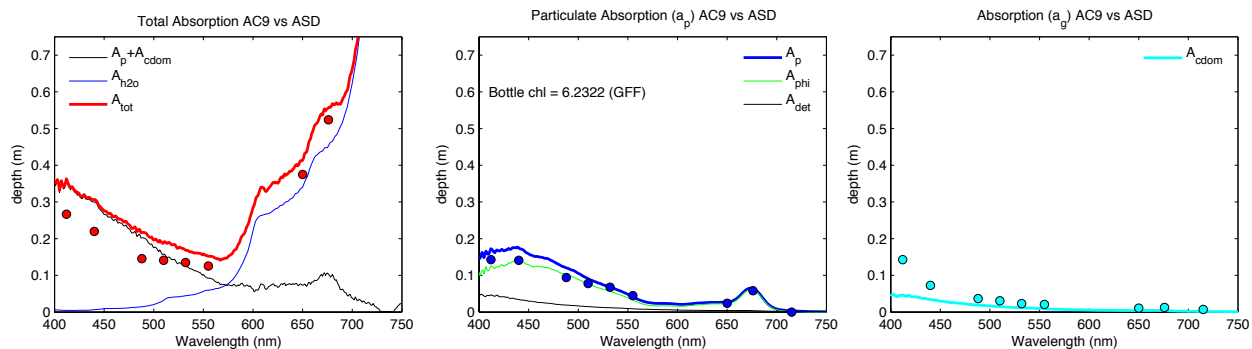


Filter Pad Absorption (w/ AC9)

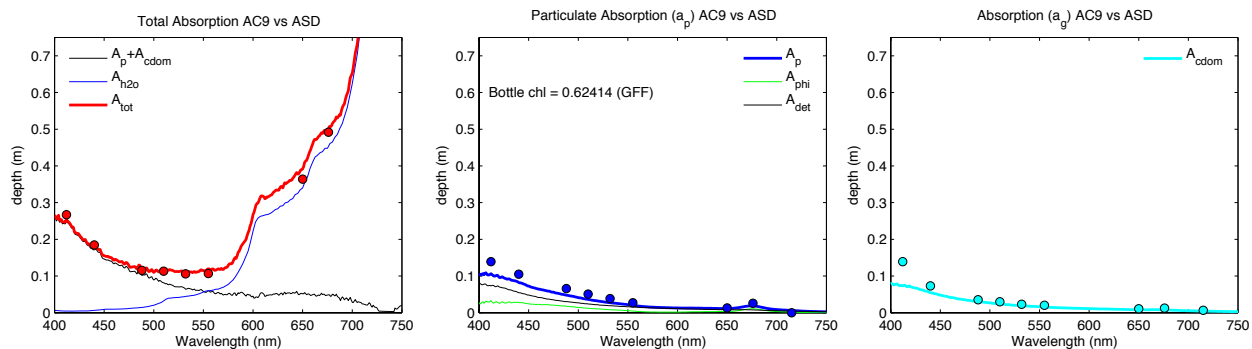
AC9 vs ASD Cast 54 – 0m (PRF2010292_49_corr.dat) CTD 13



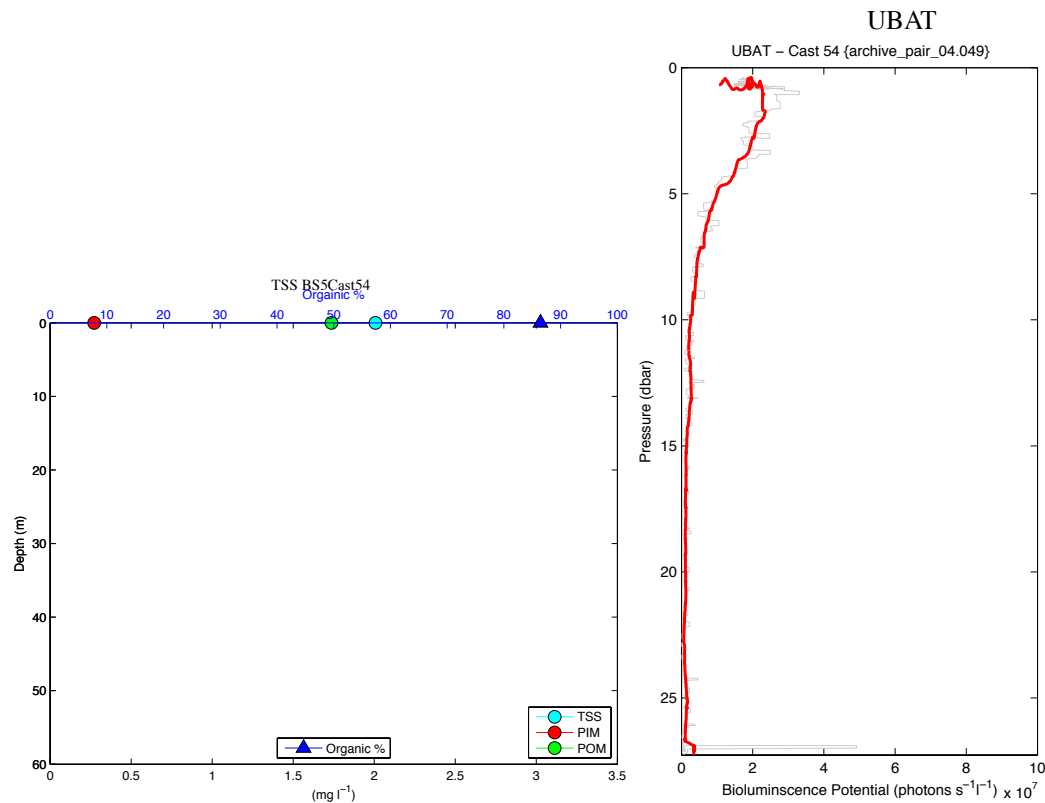
AC9 vs ASD Cast 54 – 4m (PRF2010292_49_corr.dat) CTD 13



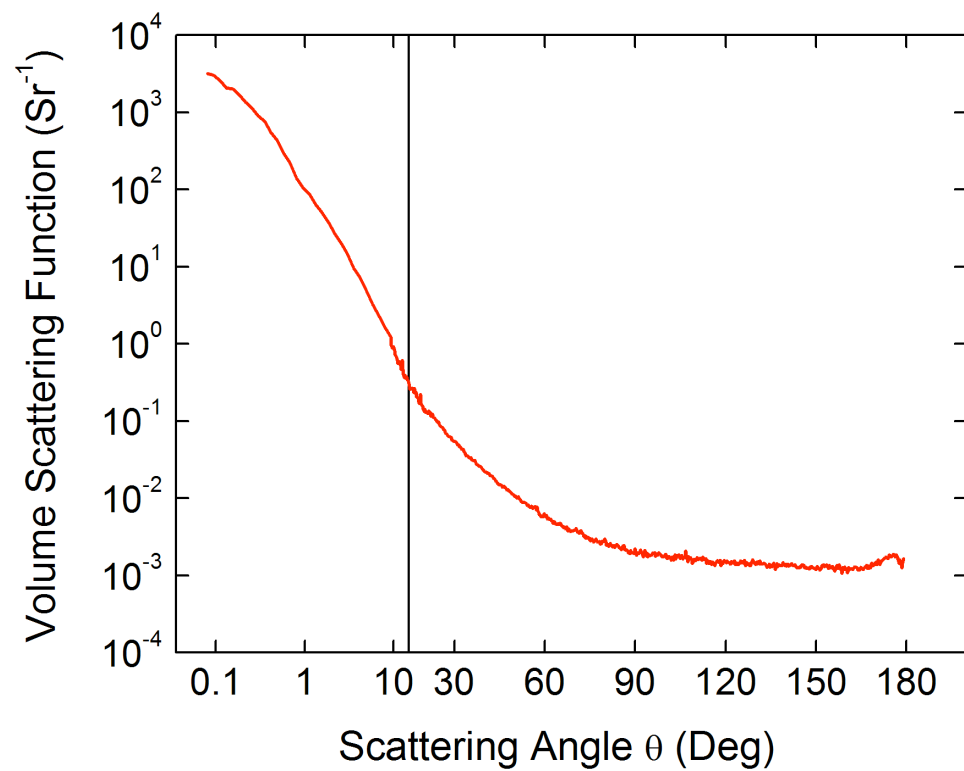
AC9 vs ASD Cast 54 – 14m (PRF2010292_49_corr.dat) CTD 13



TSS



MVSM

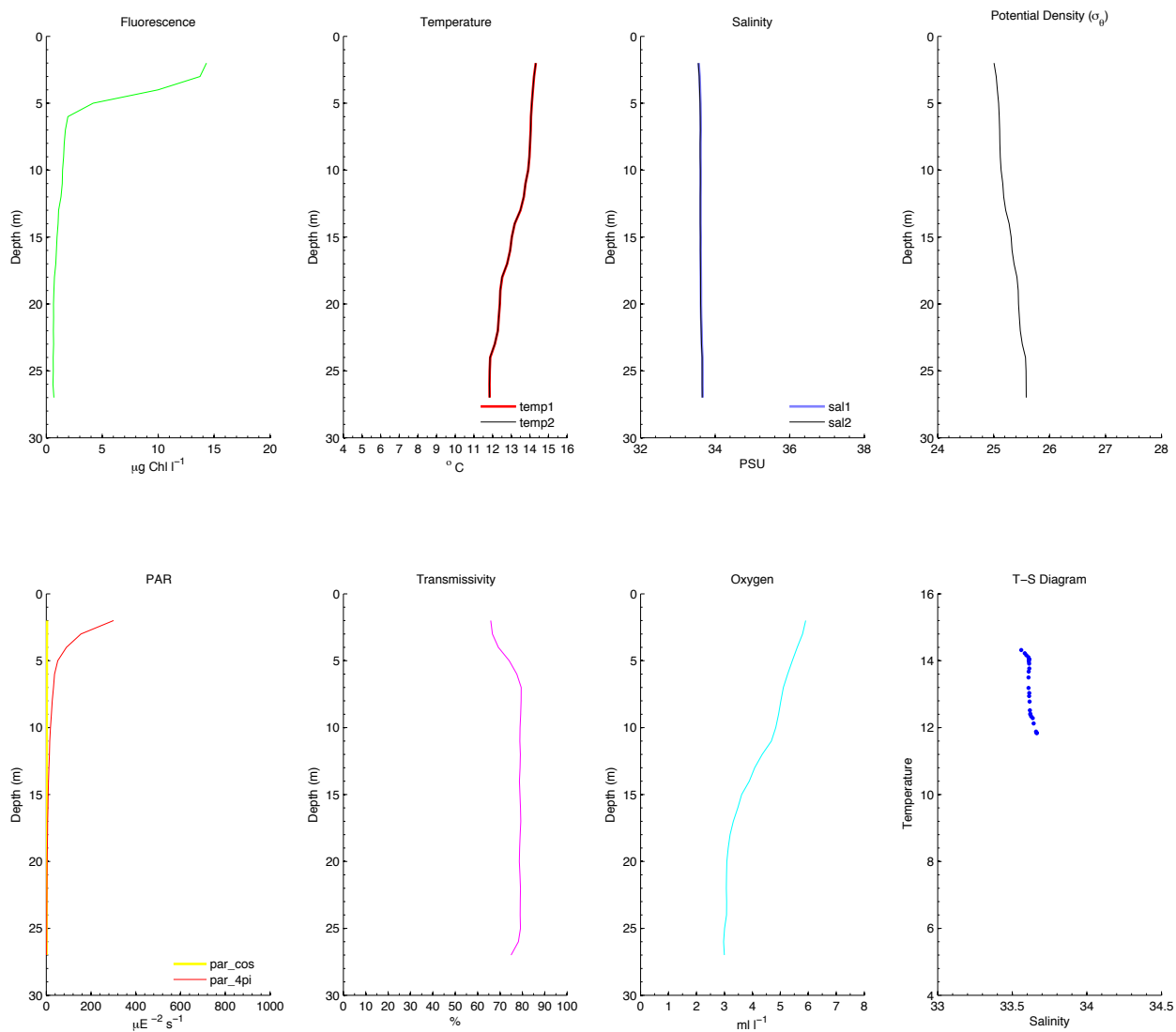


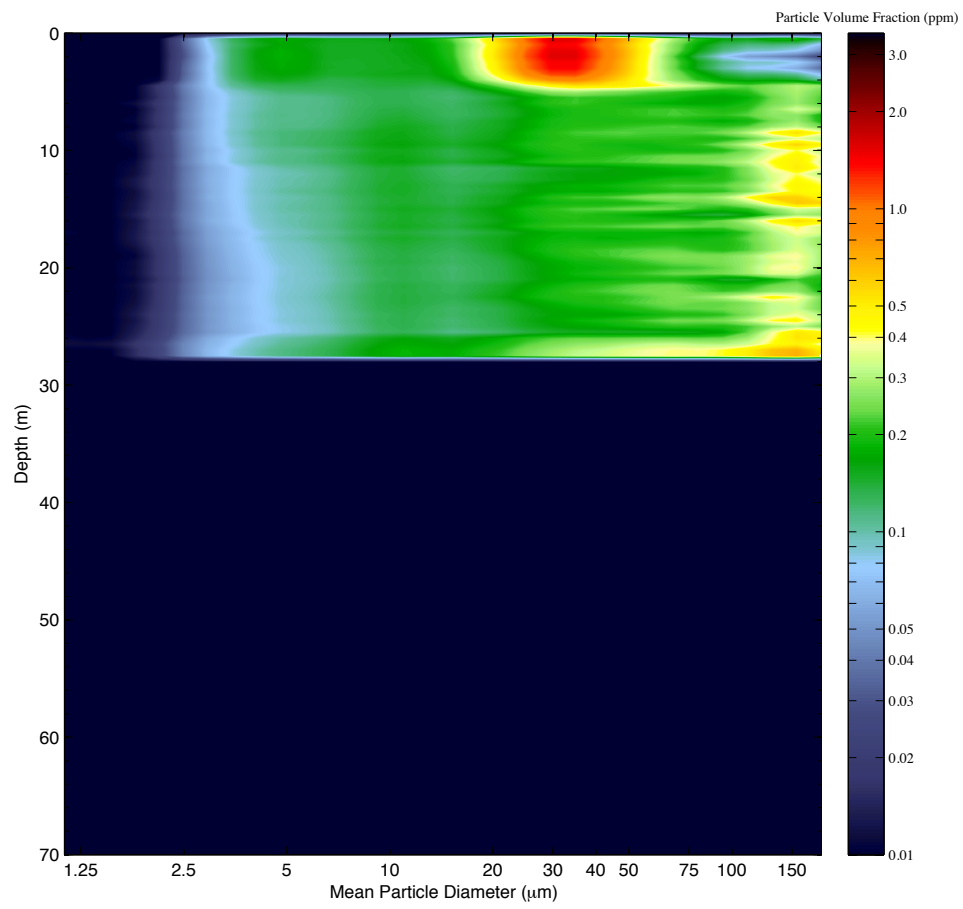
Cast 55 (1100 PDT; [Station BS05](#))

(CTD and optics cast only - no bottles) (foggy)

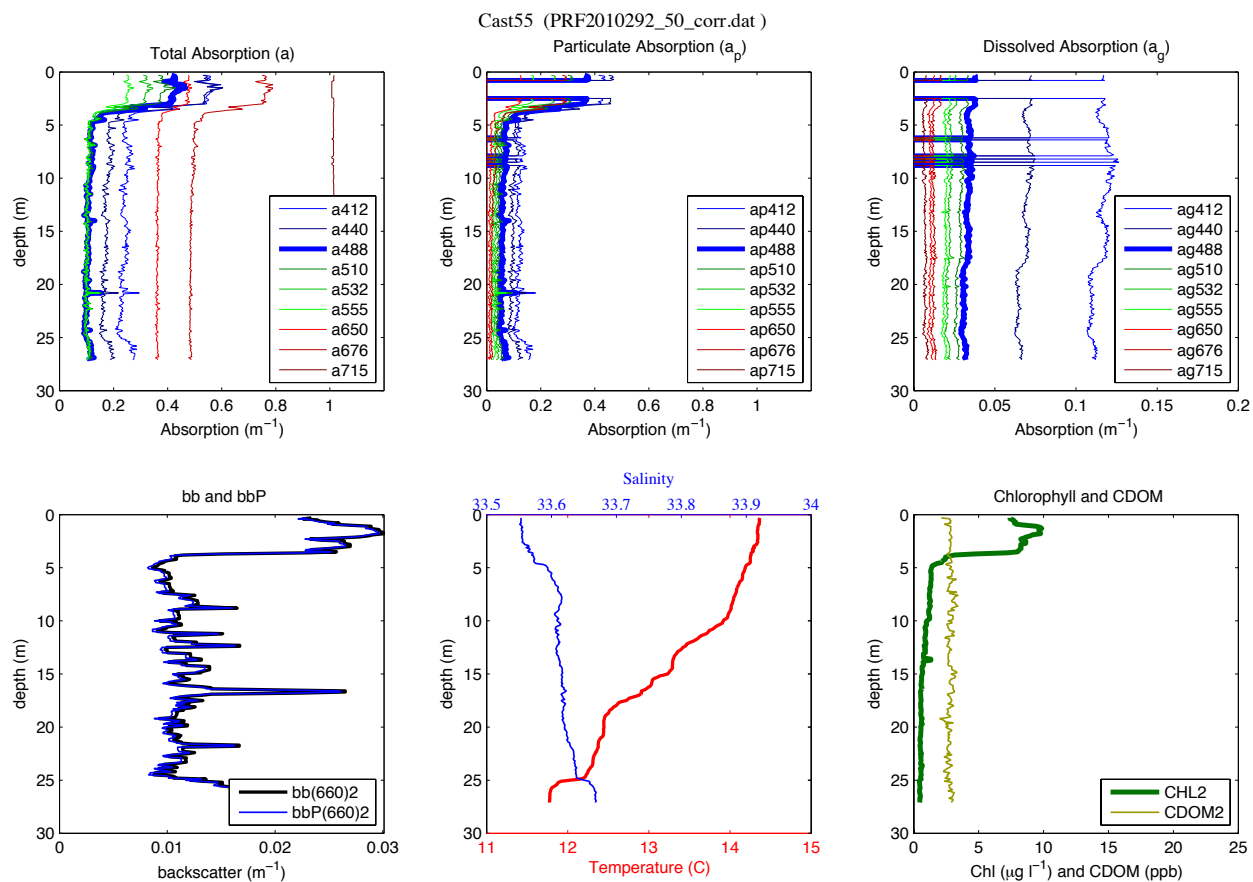
CTD

BIOSPACE 2010 Cast 55 (CTD05; 2010-10-19 18:02:23.000 UTC) CTD Downcast Data (Calibrated)

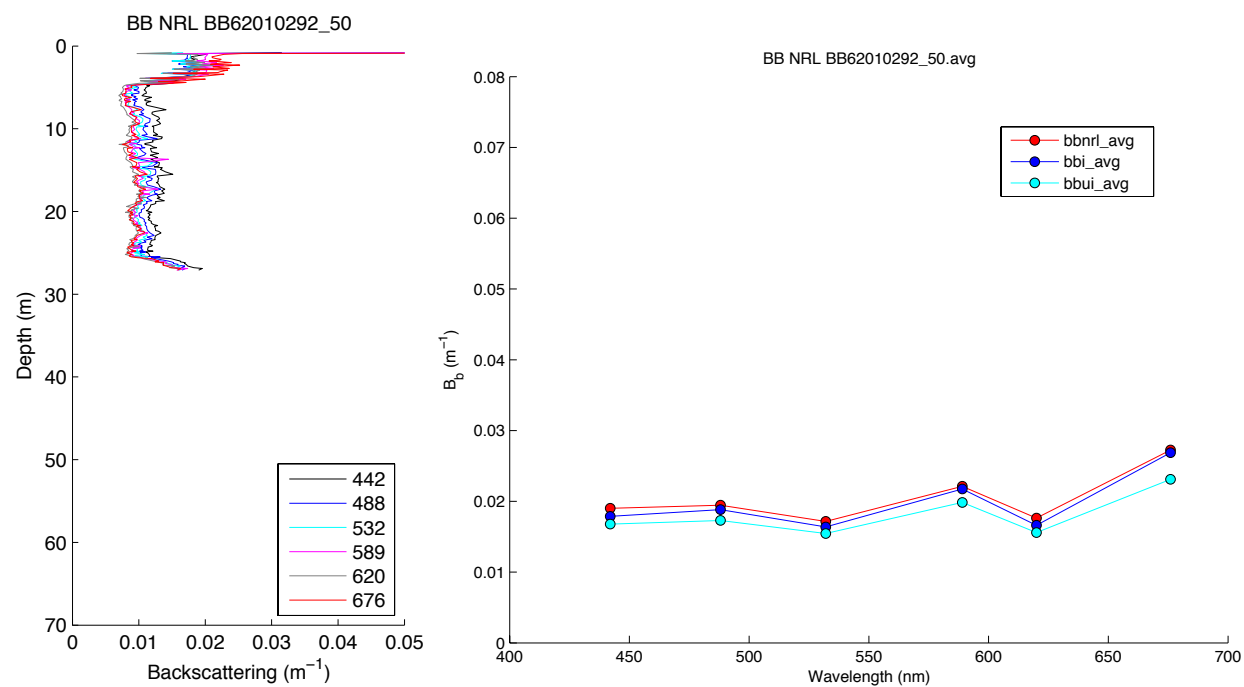




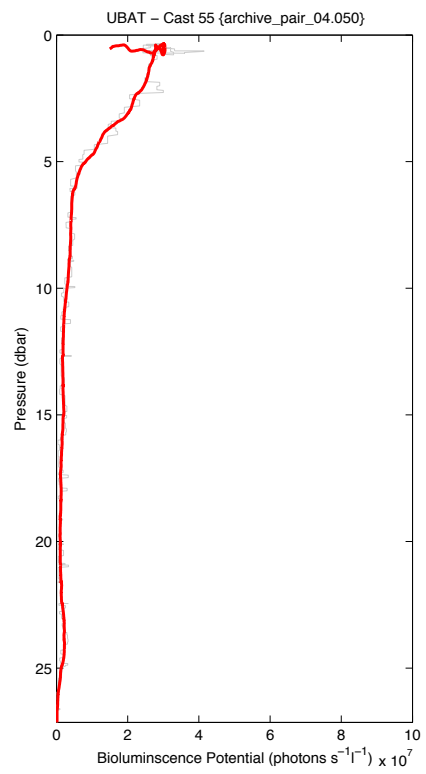
Optics Profile Package



HydroScat



UBAT

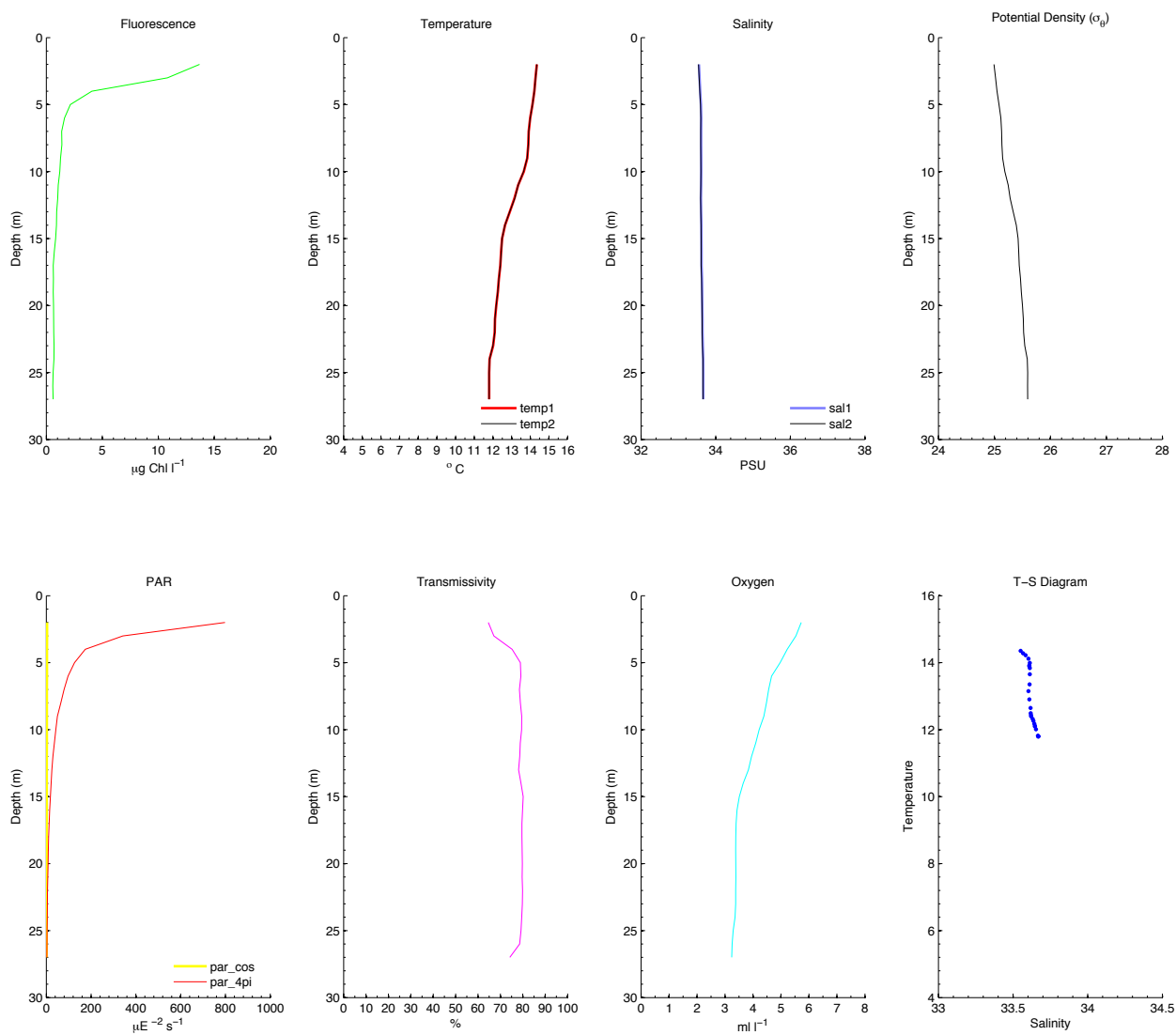


Cast 56 (1200 PDT; [Station BS05](#))

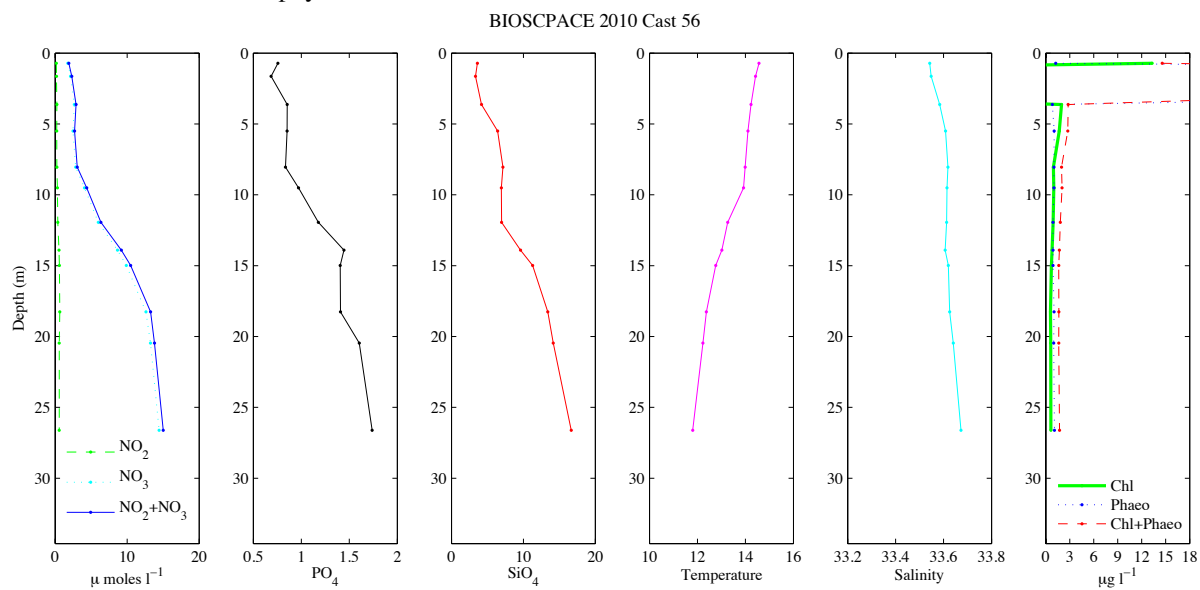
(very thick surface patch came after the bottles. Optics were below (note: check flow-through data for this signal). Flow-through FRRs showed a very strong signal when this patch passed. The flow-through CO₂ sensor showed a big drop.) (foggy)

CTD

BIOSPACE 2010 Cast 56 (CTD05; 2010-10-19 18:58:00.000 UTC) CTD Downcast Data (Calibrated)

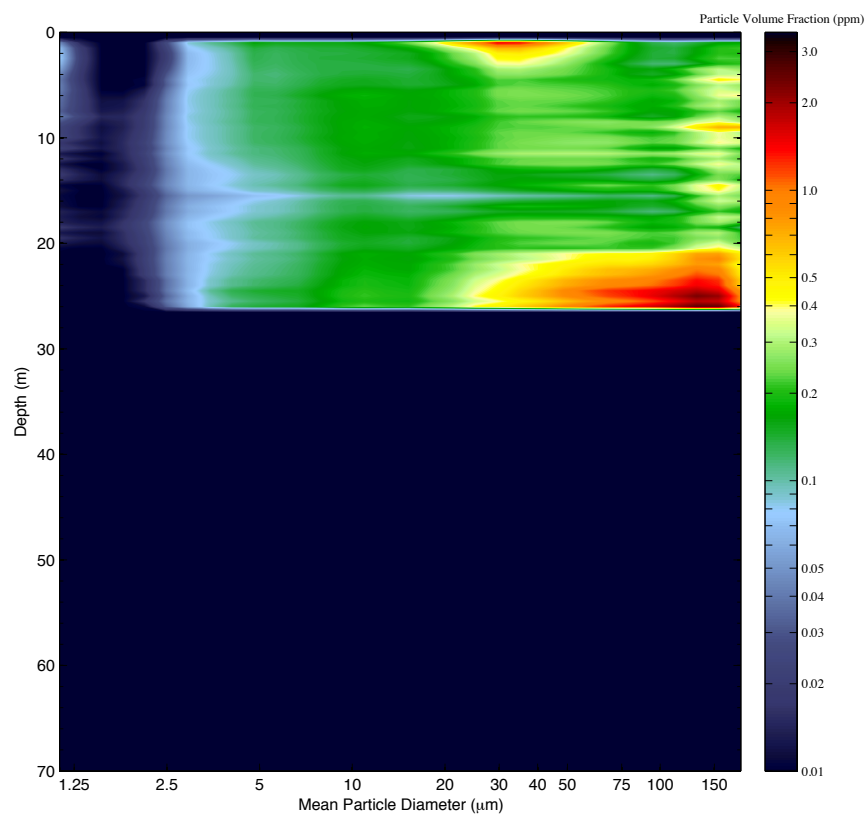


Bottle Nutrients and Chlorophyll

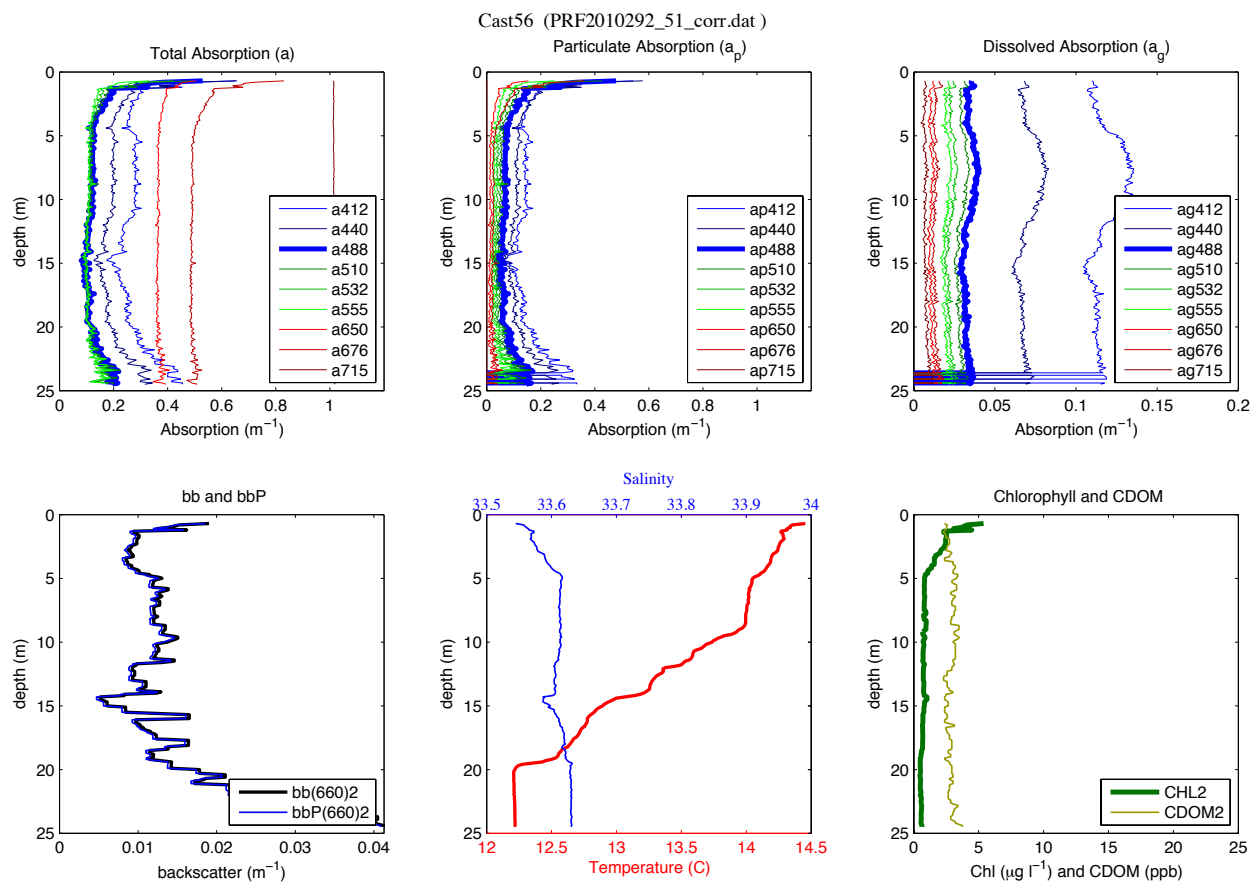


LISST

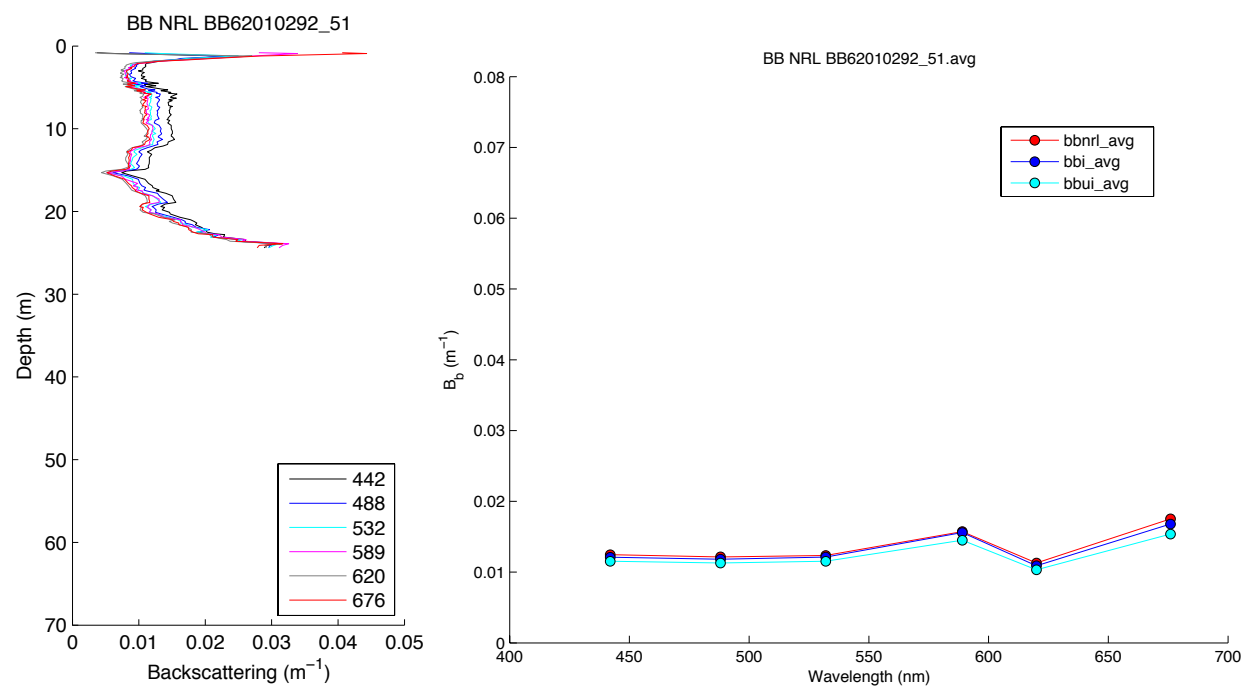
LISST – Cast 56



Optics Profile Package

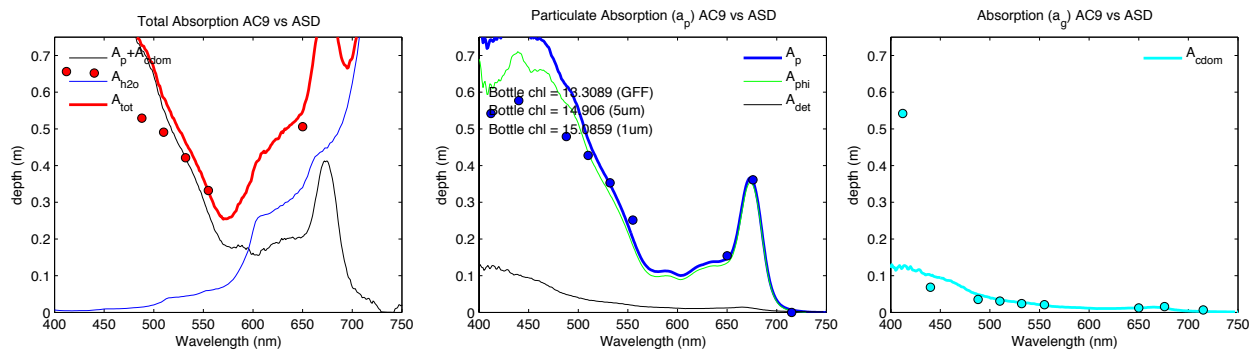


HydroScat

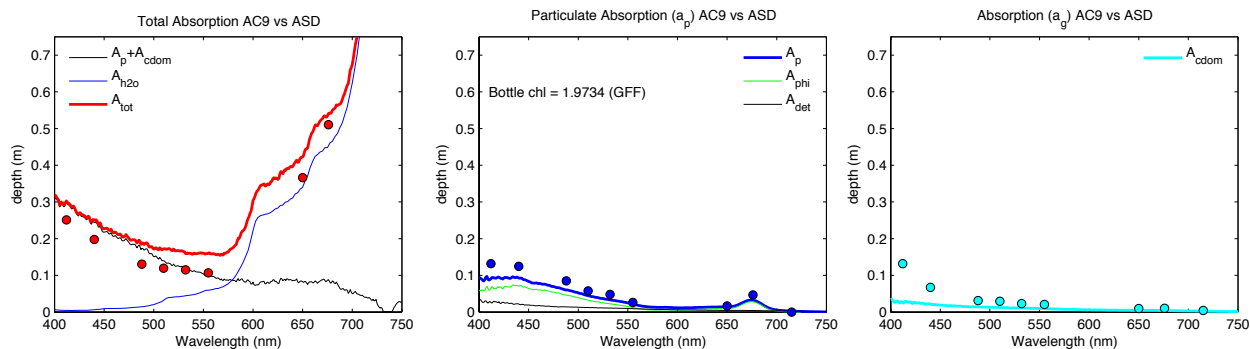


Filter Pad Absorption (w/ AC9)

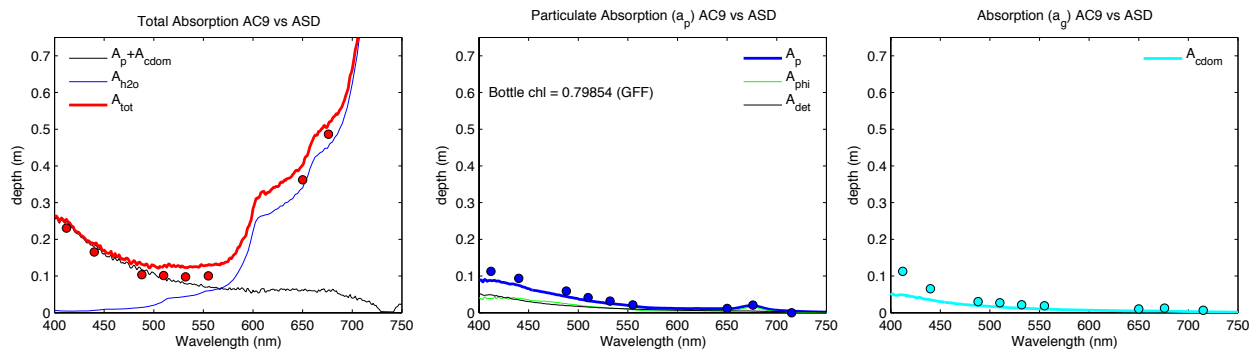
AC9 vs ASD Cast 56 – 0m (PRF2010292_51_corr.dat) CTD 05



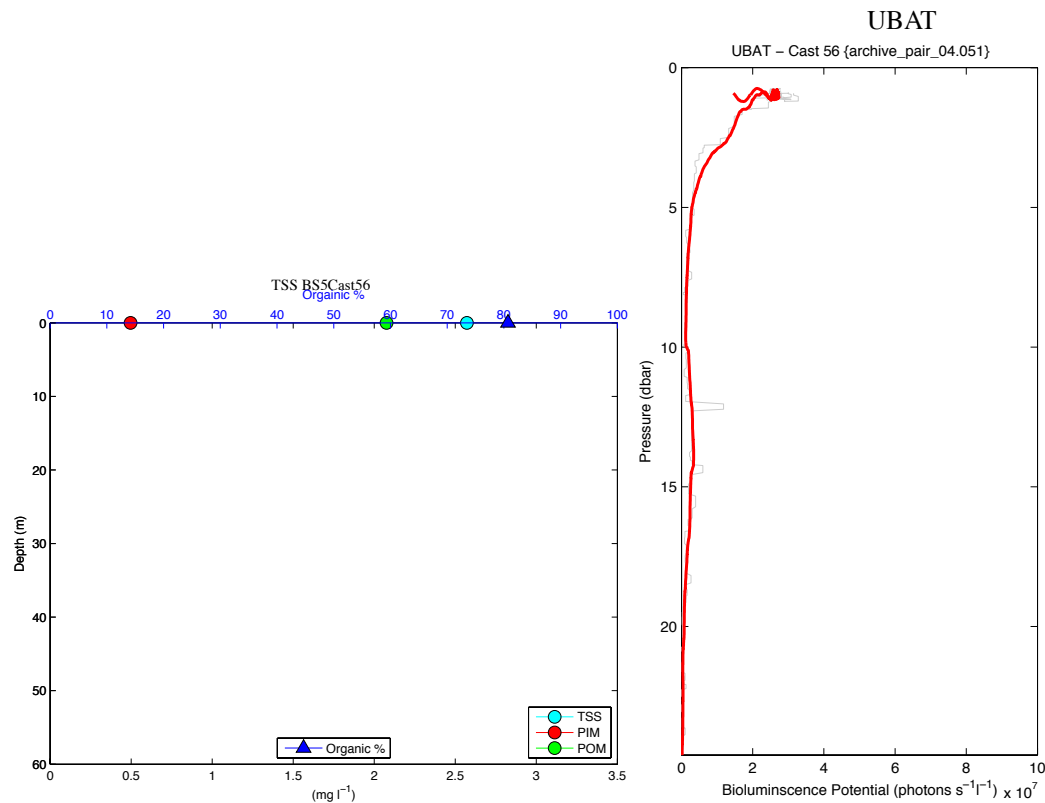
AC9 vs ASD Cast 56 – 4m (PRF2010292_51_corr.dat) CTD 05



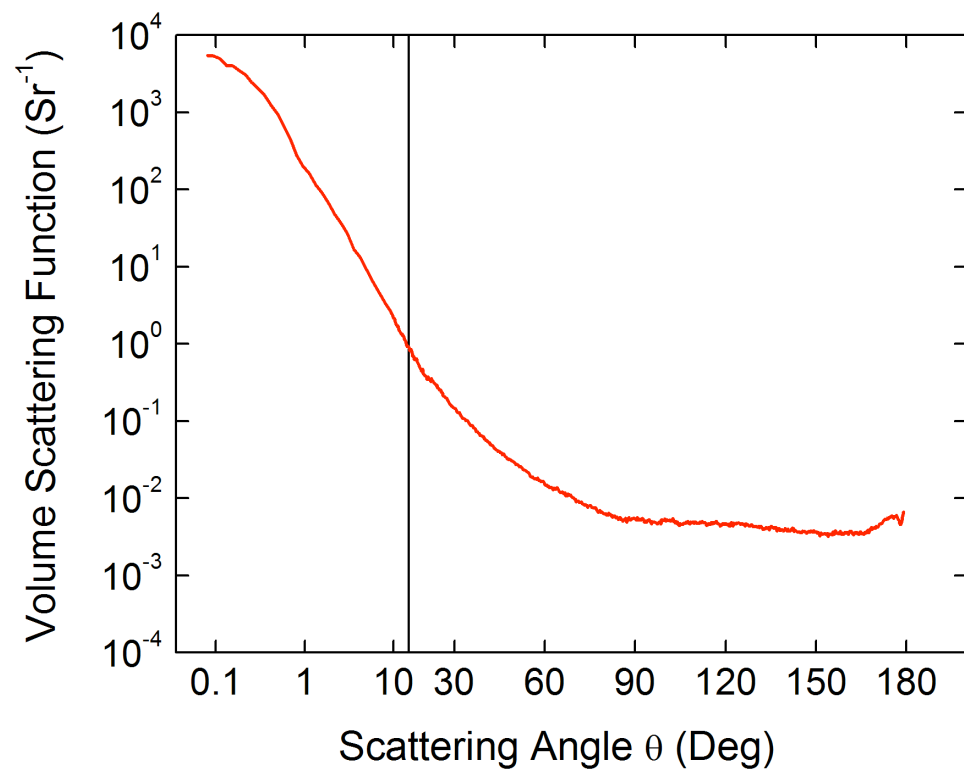
AC9 vs ASD Cast 56 – 14m (PRF2010292_51_corr.dat) CTD 05



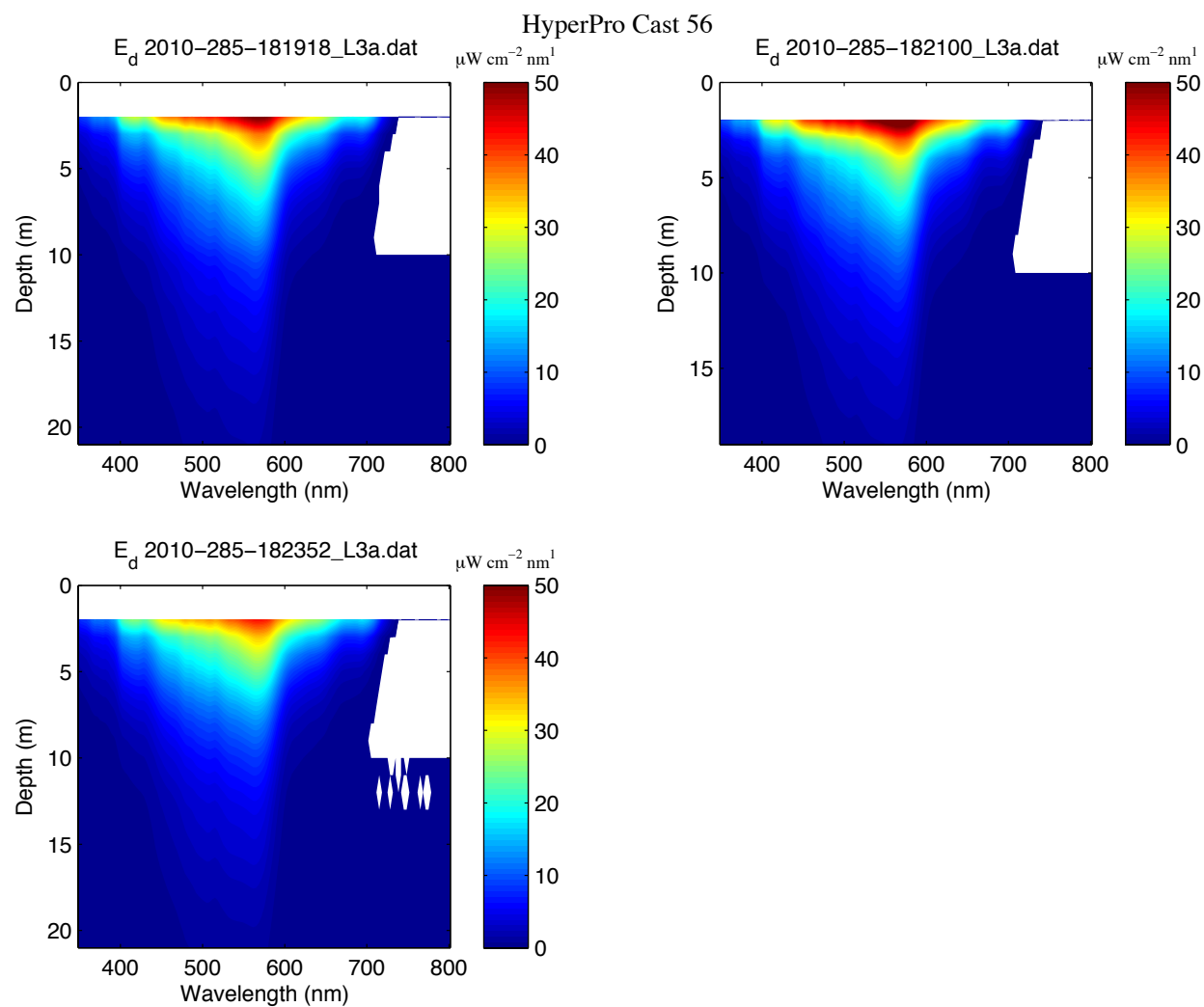
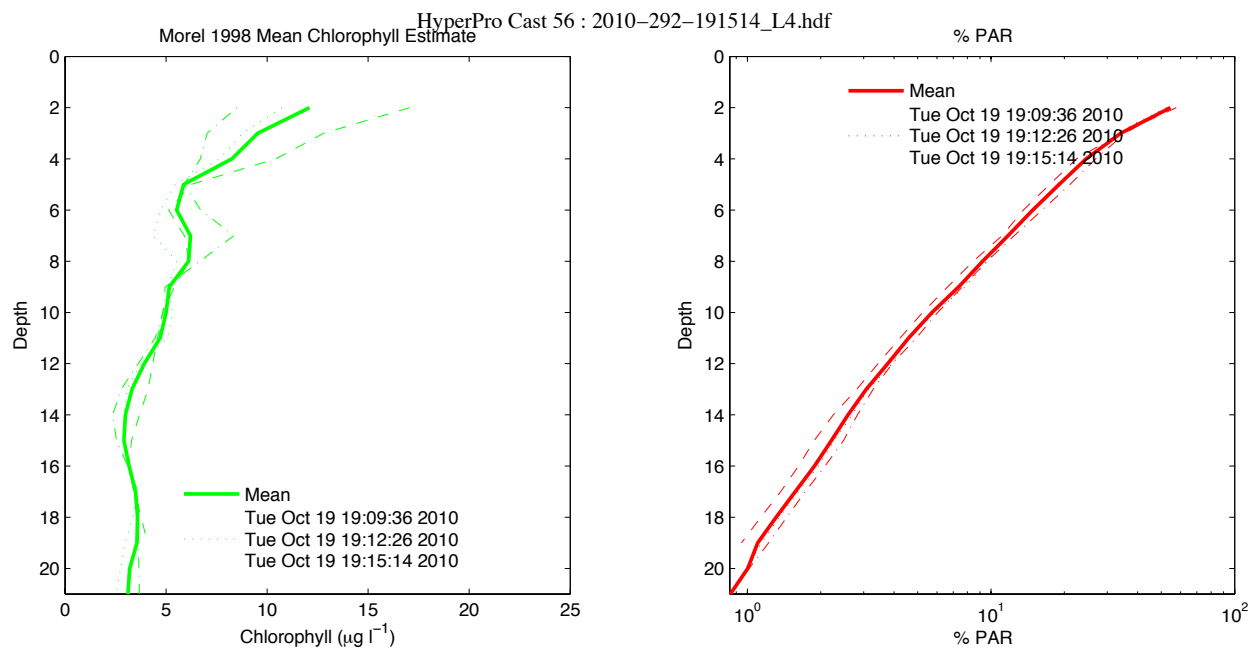
TSS



MVSM



HyperPro

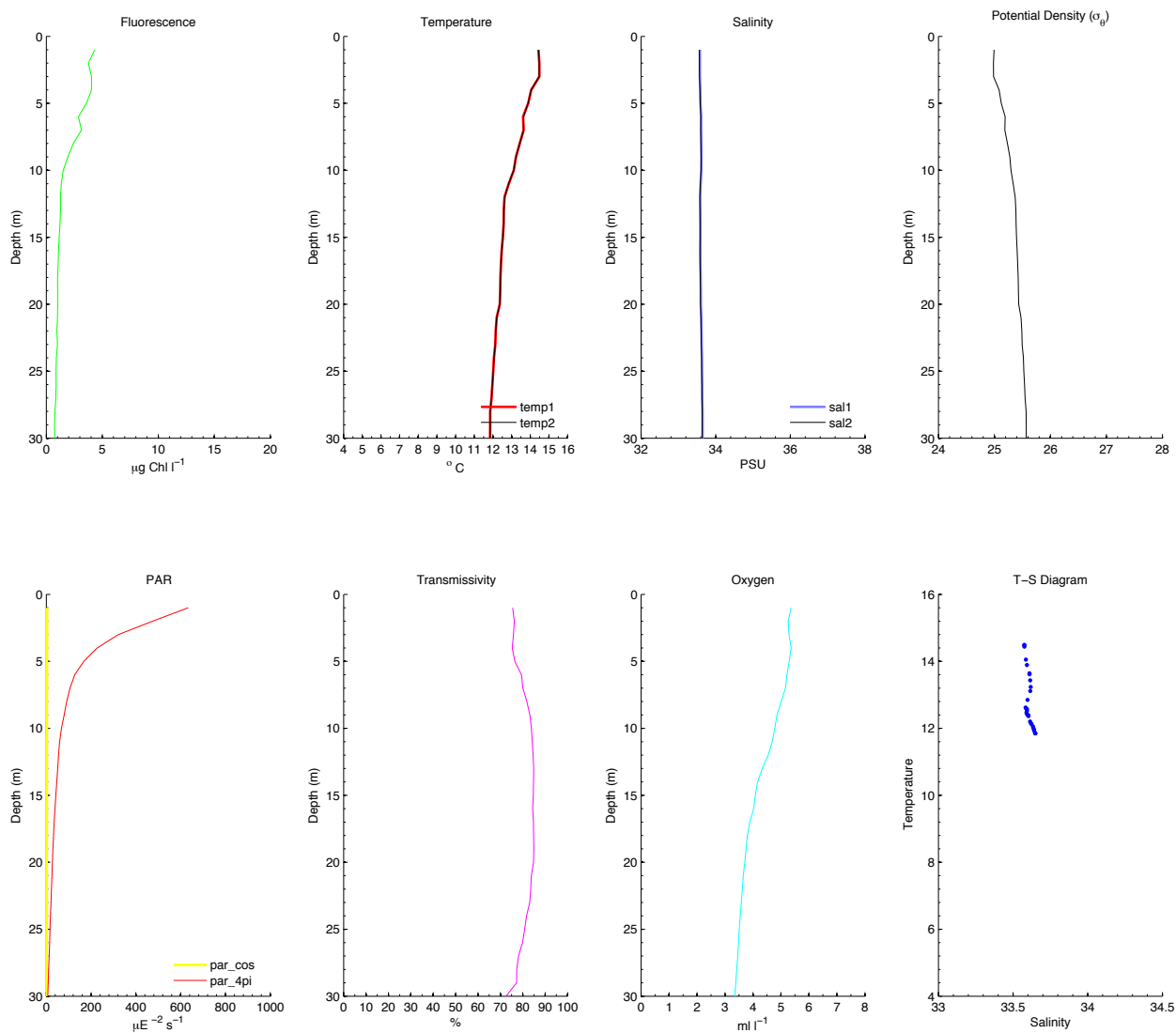


Cast 57 (1254 PDT; Glider SL082 post-calibration)

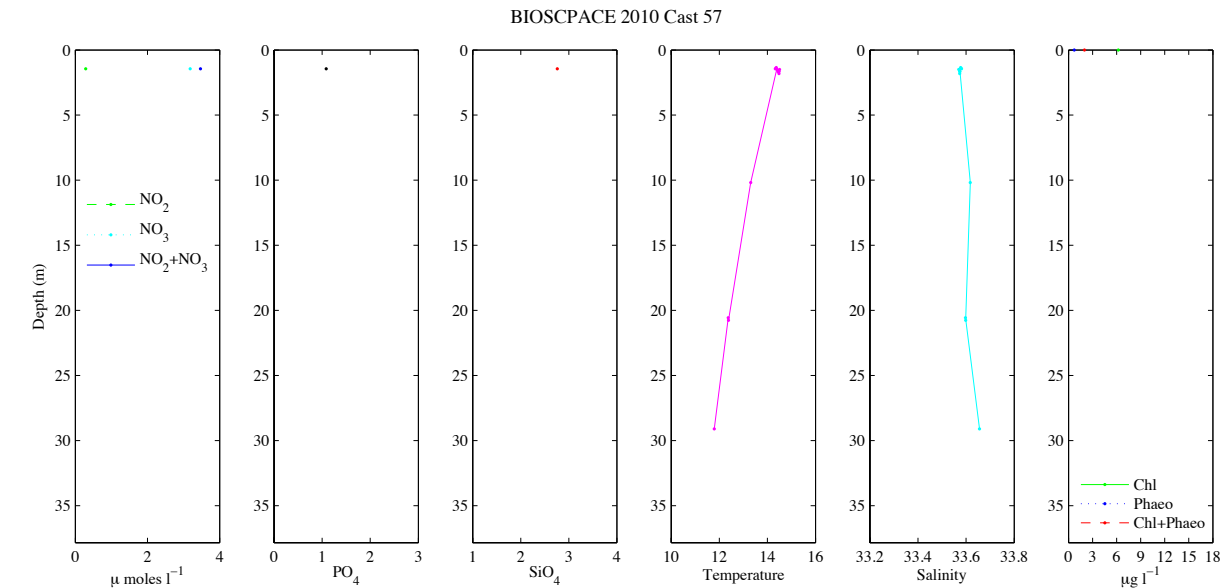
(CTD cast to 27 m, bottles @surface; cleaned glider window, bucket sample for chlorophyll)

CTD

BIOSPACE 2010 Cast 57 (Glider CAL; 2010-10-19 19:59:00.000 UTC) CTD Downcast Data (Calibrated)

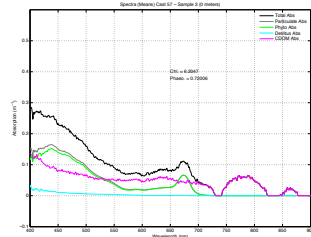


Bottle Nutrients and Chlorophyll

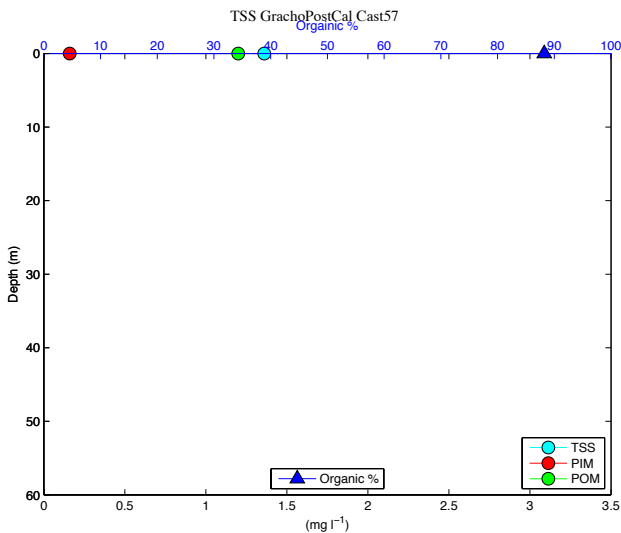


Filter Pad Absorption
Cast 57

Surface



TSS

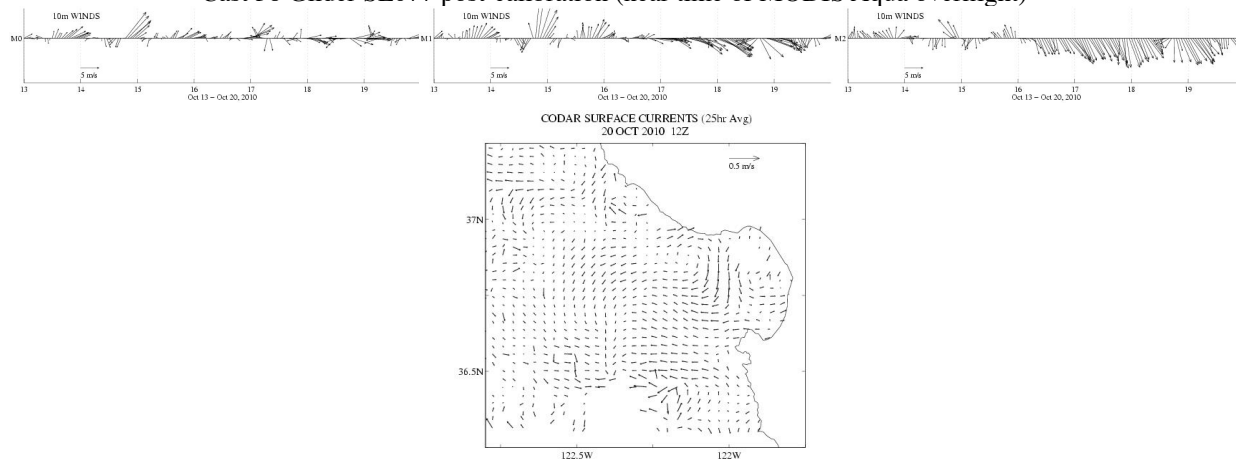


10/20

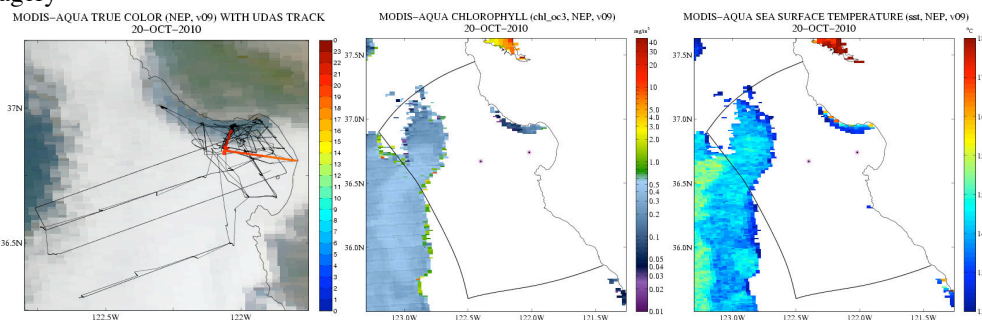
(weak upwelling) *Prorocentrum micans* and *Pseudo-nitzschia* blooms in different areas of MB

Flow-through stations A&B

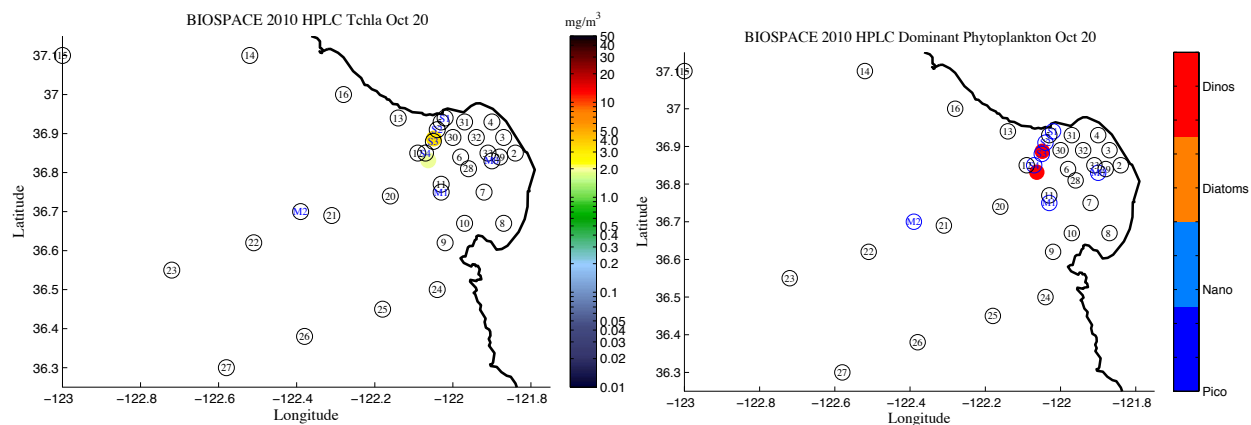
Cast 58 Glider SL077 post-calibration (near time of MODIS Aqua overflight)



Satellite Imagery



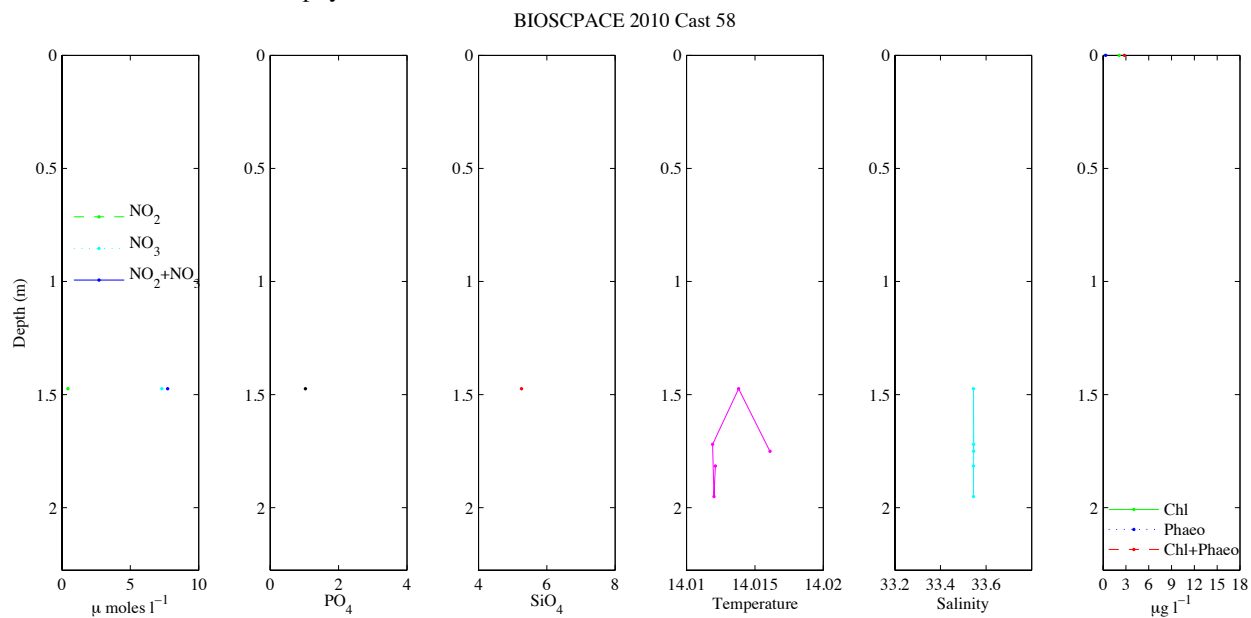
HPLC



Cast 58 (1300 PDT; [Glider SL077 post-calibration](#))

(Surface only; collected samples then cleaned glider and took bucket chlorophyll sample from surface - MODIS overflight 13:24 local - surface sal 33.39)

Bottle Nutrients and Chlorophyll

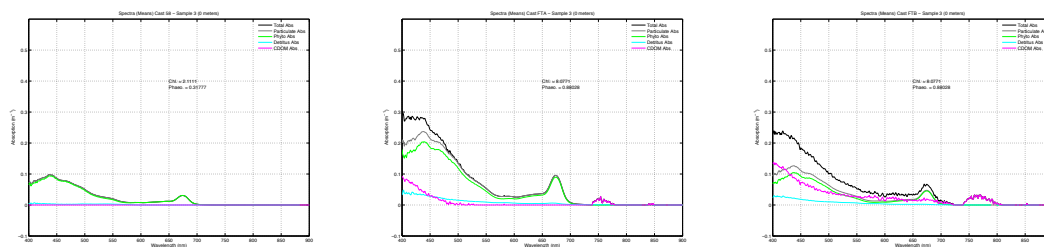


Filter Pad Absorption

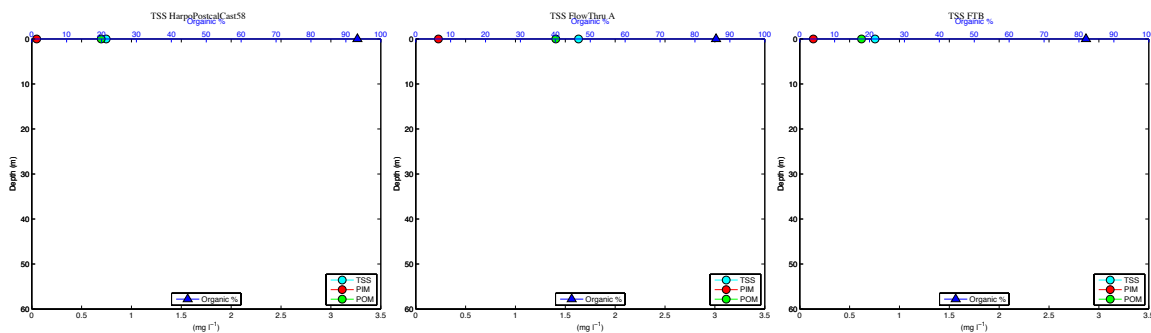
Cast 58 Surface

[FTA](#) (1215 PDT)

[FTB](#) (1730 PDT)

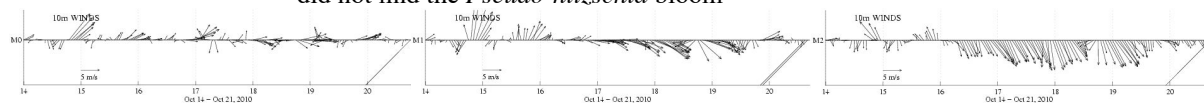


TSS

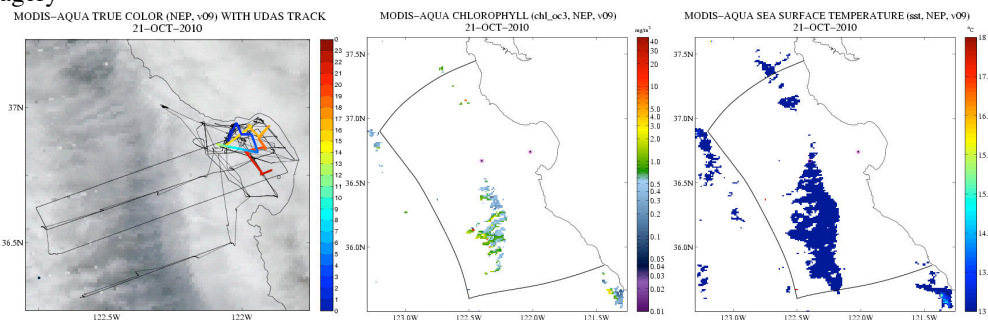


10/21

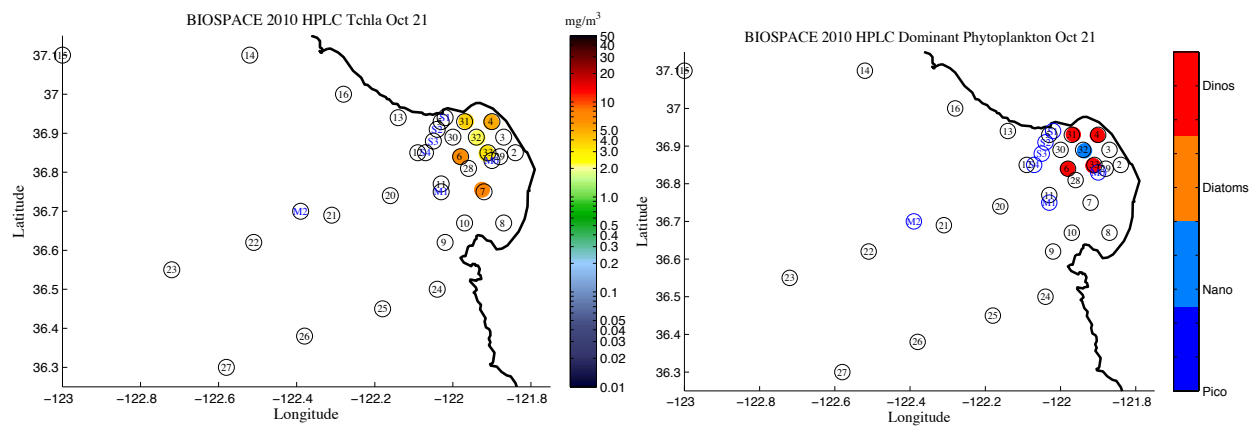
(weak upwelling) *Pseudo-nitzschia* bloom not found (biospace) BIOSPACE Cruise data collection ends
 Casts 59-64 - looking for *Pseudo-nitzschia* bloom to sample domoic acid for Raphe/Francisco
 Stations 31, 4, 32, 33, 6, and 7 - NE Bay and N and S edges of canyon
 did not find the *Pseudo-nitzschia* bloom



Satellite Imagery



HPLC

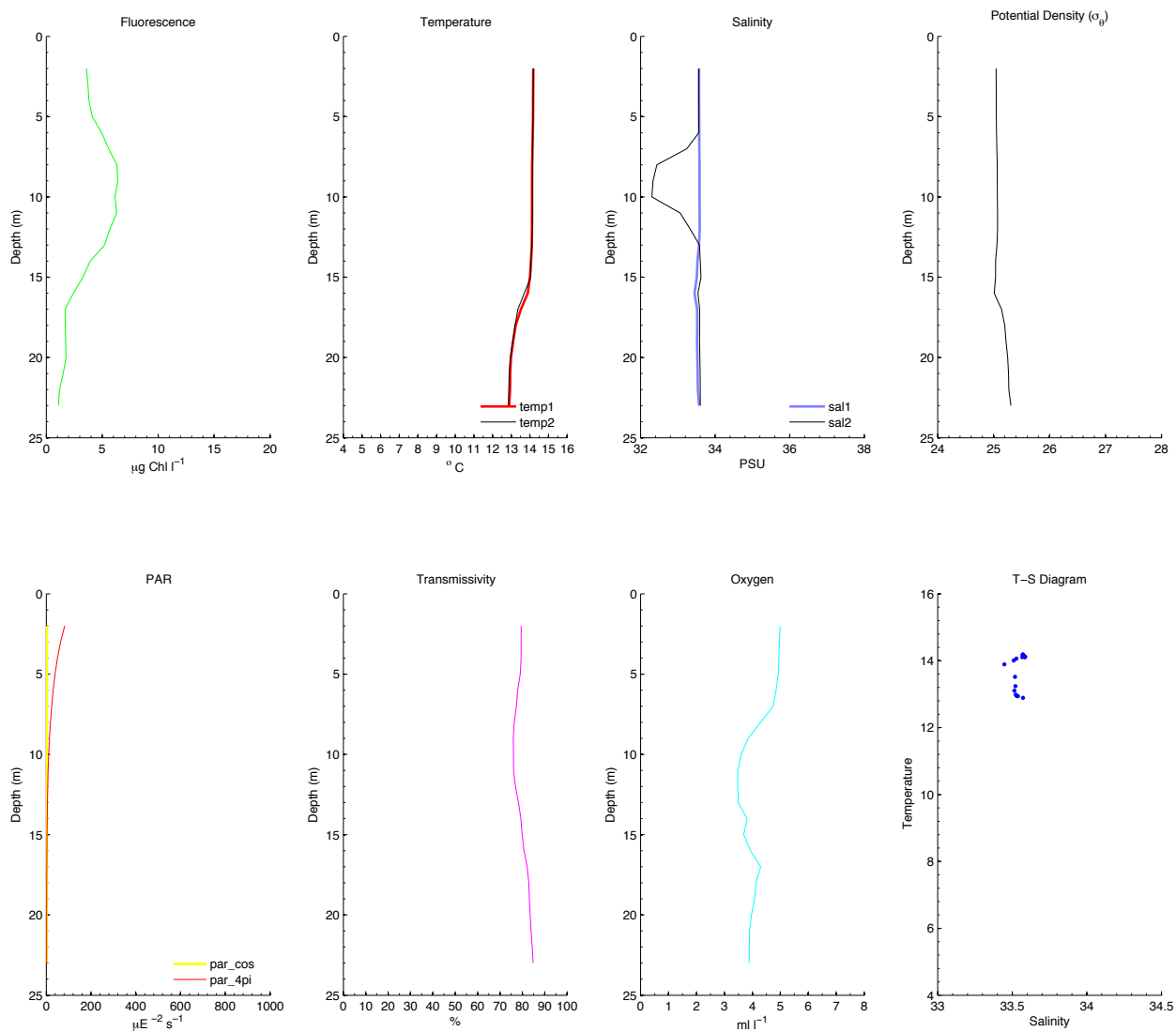


Cast 59 (0850 PDT; [Station BS31](#))

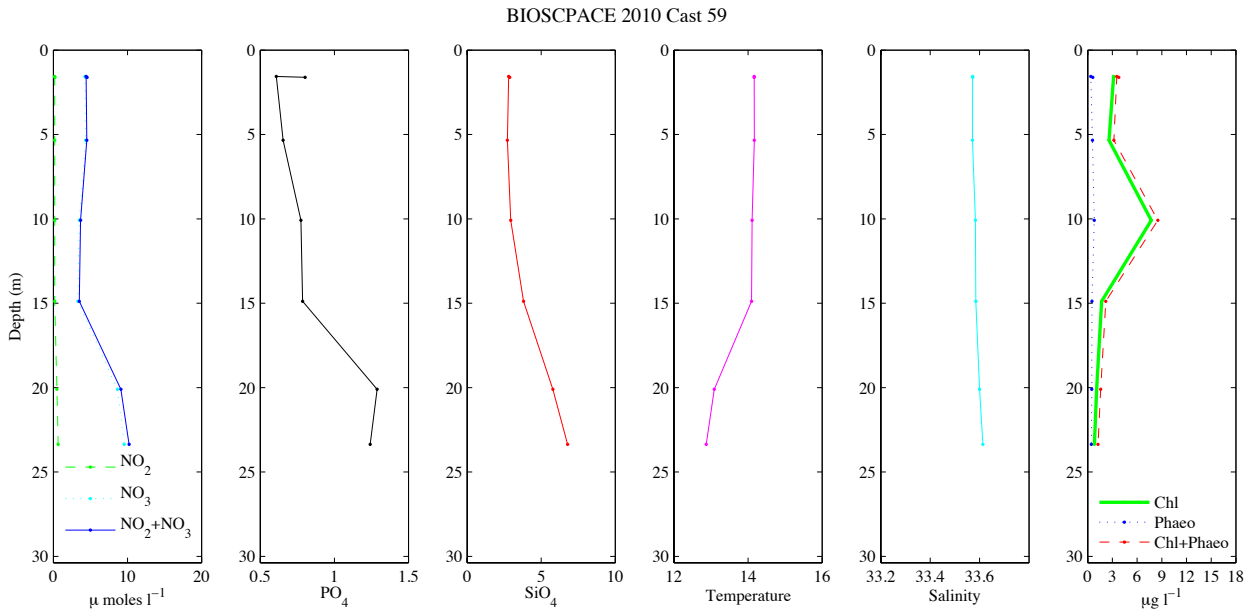
[1) plankton net-mixed dinos-surface, 2) plankton 10m (fluor peak) also mixed dinos]

CTD

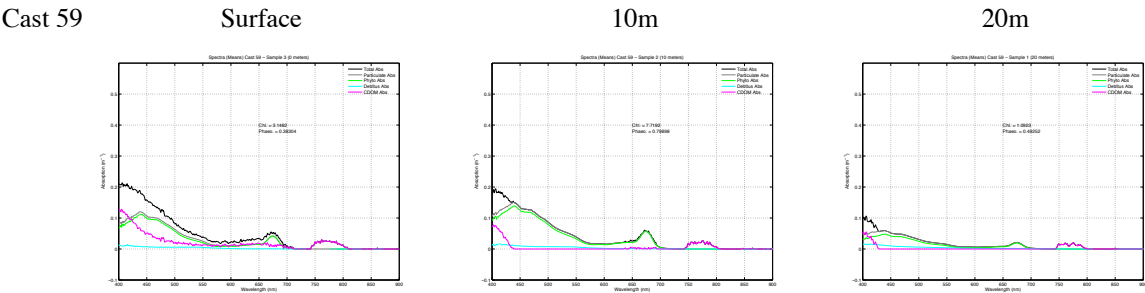
BIOSPACE 2010 Cast 59 (CTD31; 2010-10-21 15:51:00.000 UTC) CTD Downcast Data (Calibrated)



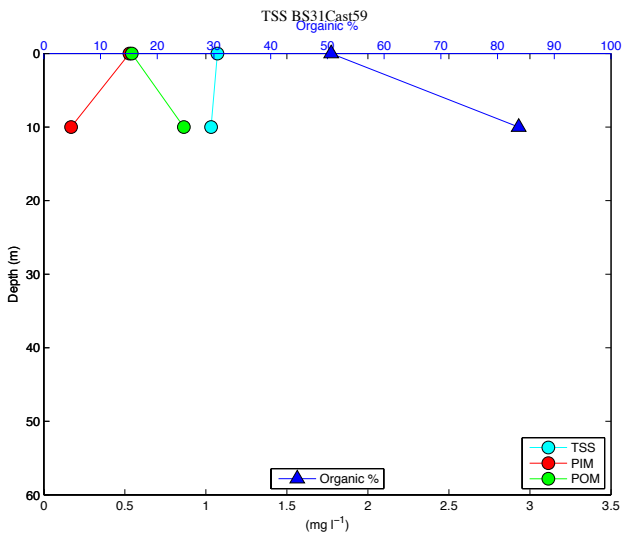
Bottle Nutrients and Chlorophyll



Filter Pad Absorption



TSS

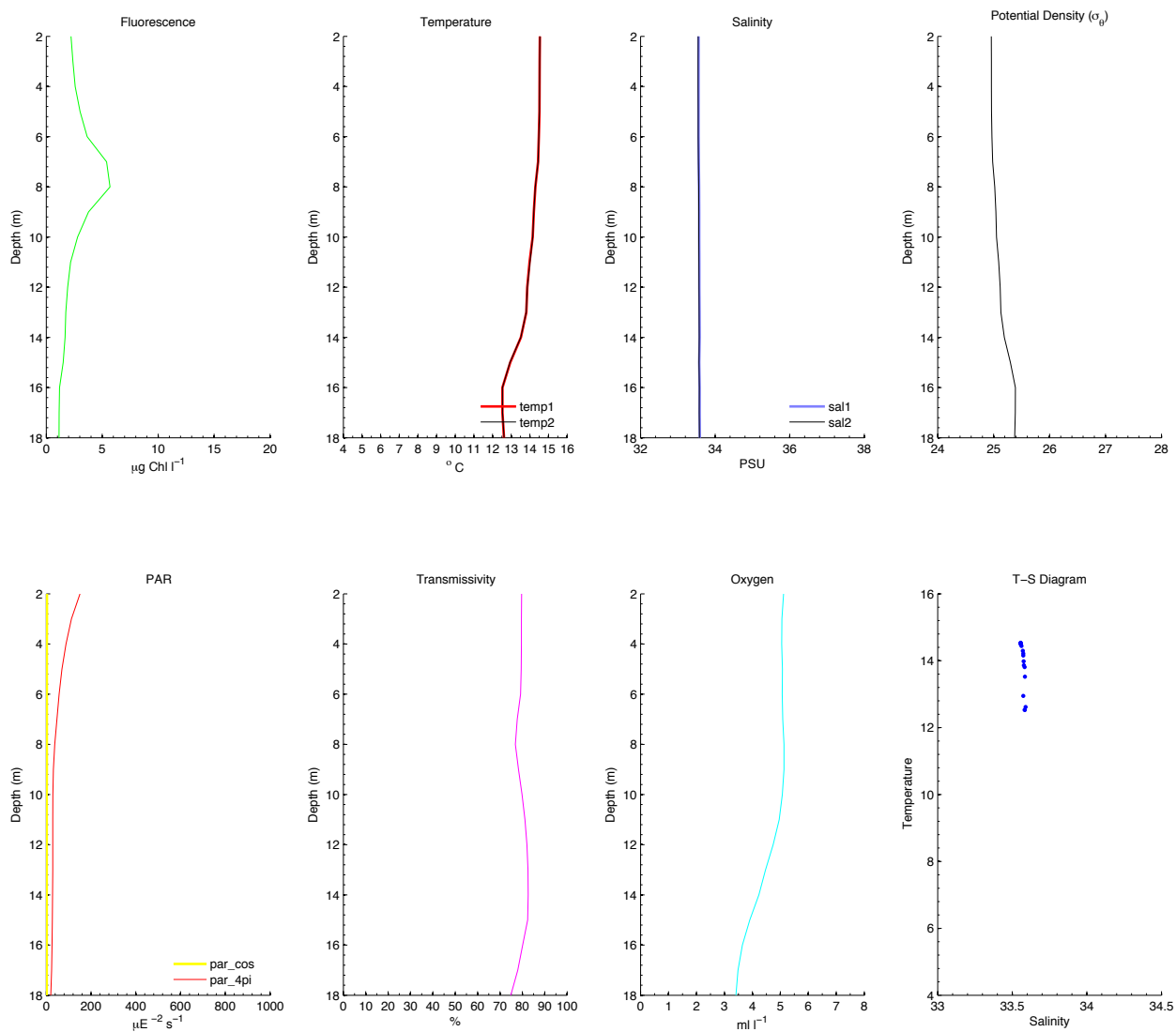


Cast 60 (1000 PDT; [Station BS04](#))

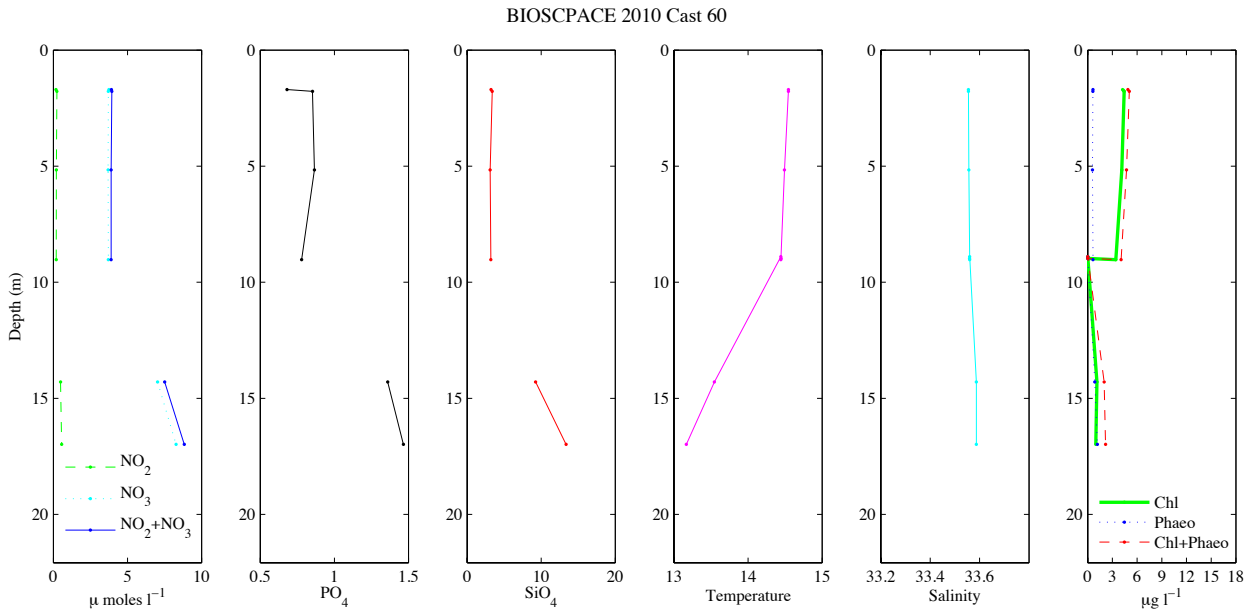
(Plankton mixed dinos; some diatoms chains + *pseudo-nitzschia* (few))

CTD

BIOSPACE 2010 Cast 60 (CTD04; 2010-10-21 17:07:00.000 UTC) CTD Downcast Data (Calibrated)



Bottle Nutrients and Chlorophyll



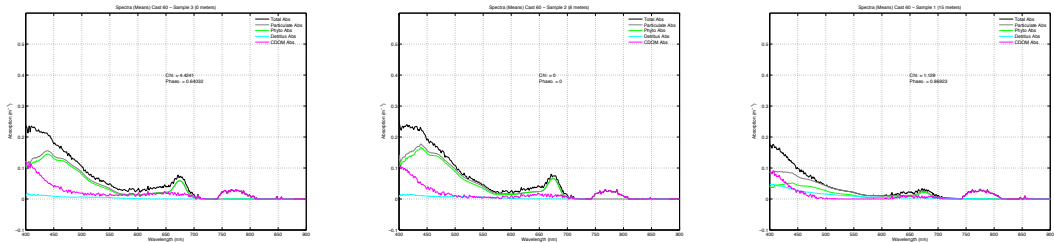
Filter Pad Absorption

Cast 60

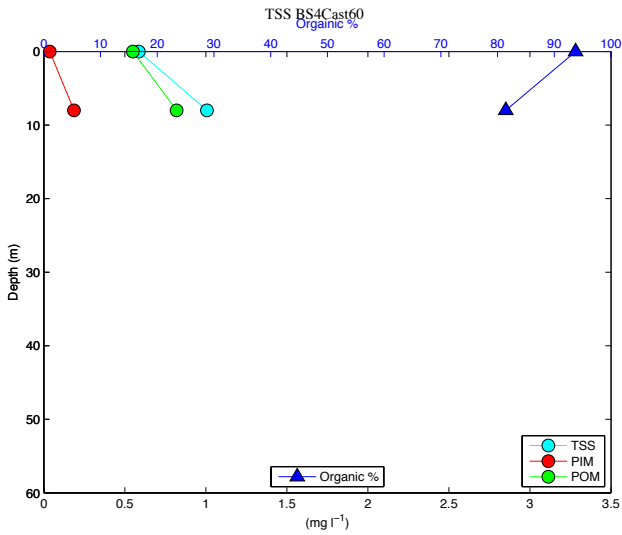
Surface

8m

15m



TSS

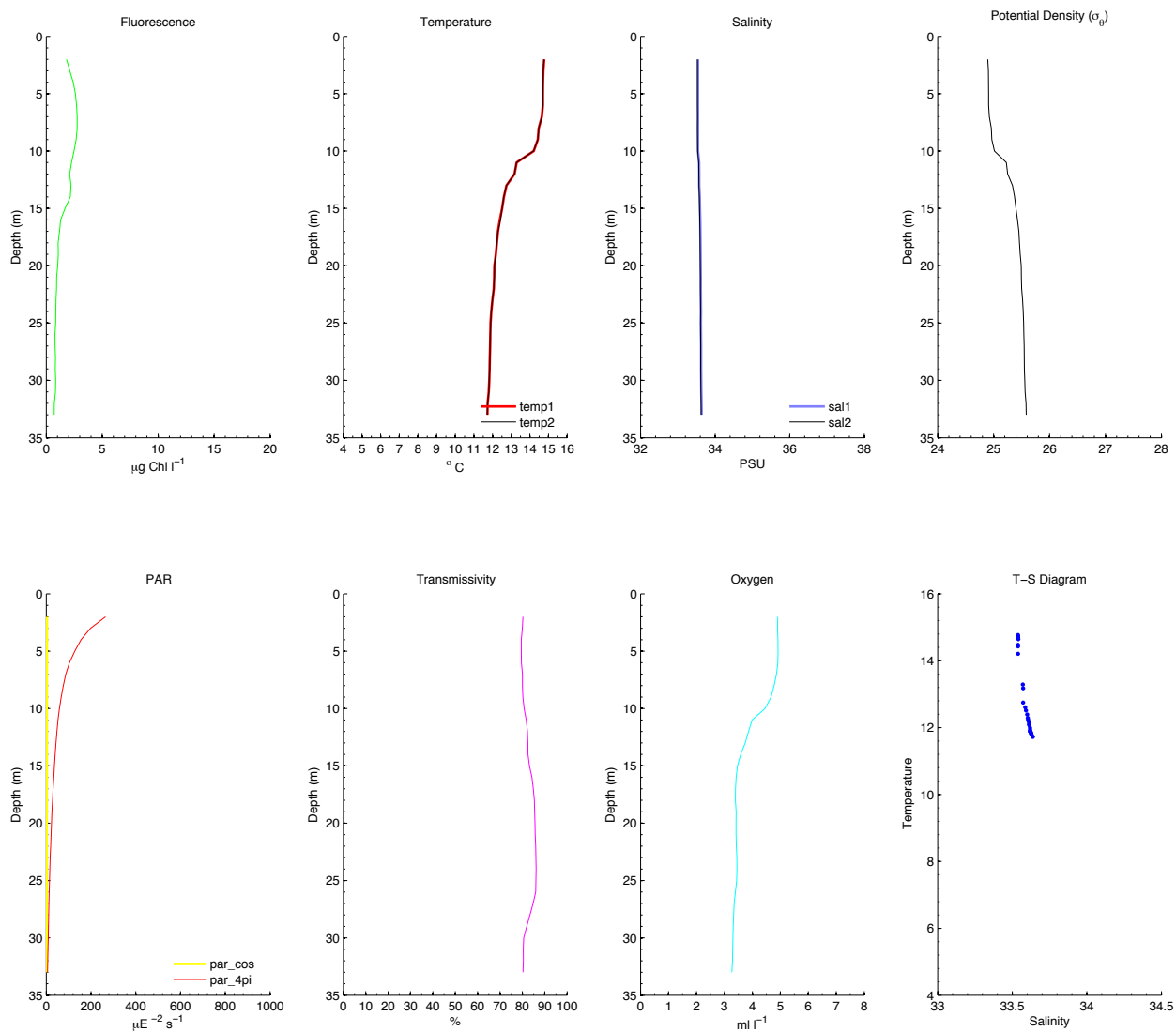


Cast 61 (1045 PDT; [Station BS32](#))

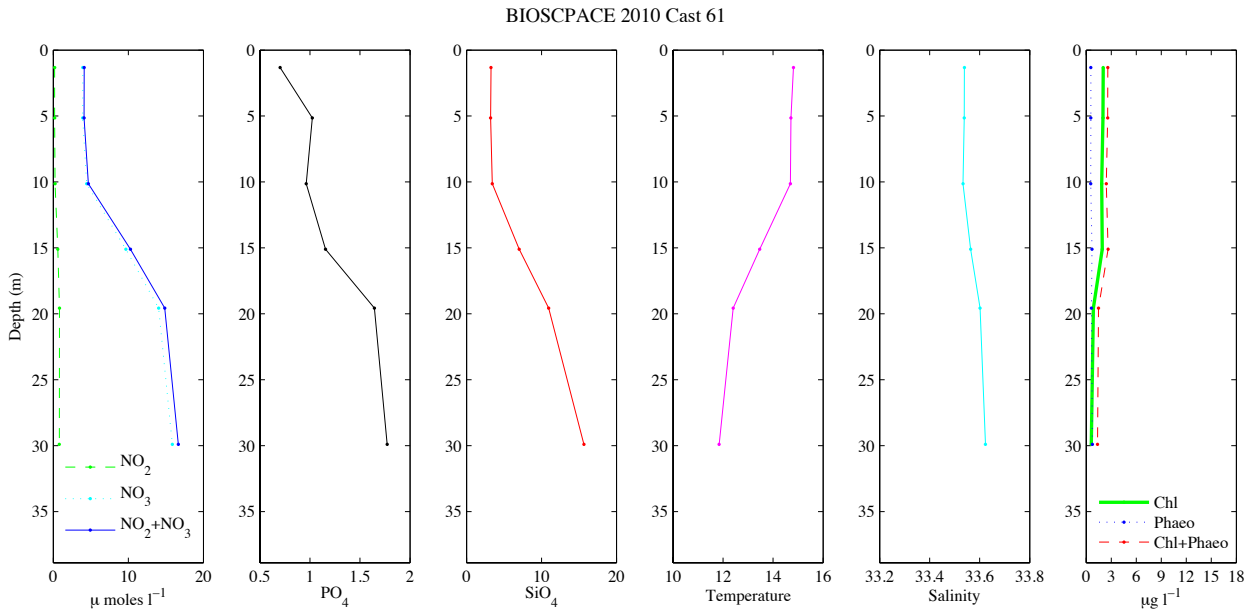
(Plankton net mixed dinos and *pseudo-nitzschia*)

CTD

BIOSPACE 2010 Cast 61 (CTD32; 2010-10-21 17:45:00.000 UTC) CTD Downcast Data (Calibrated)

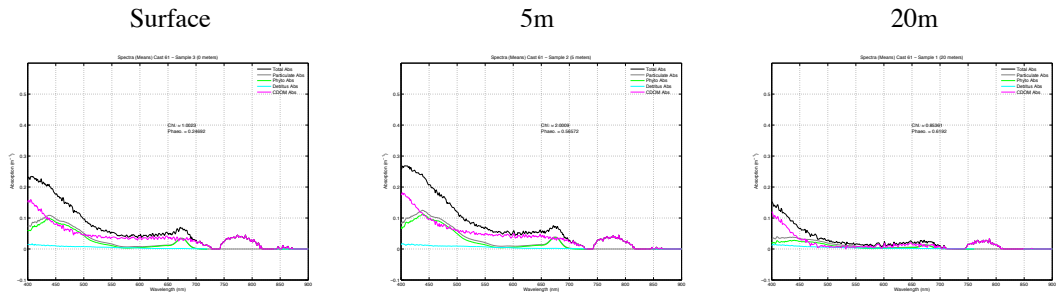


Bottle Nutrients and Chlorophyll

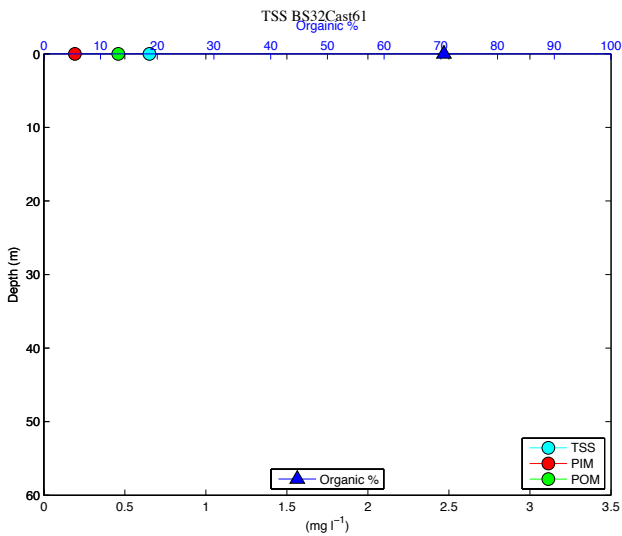


Filter Pad Absorption

Cast 61



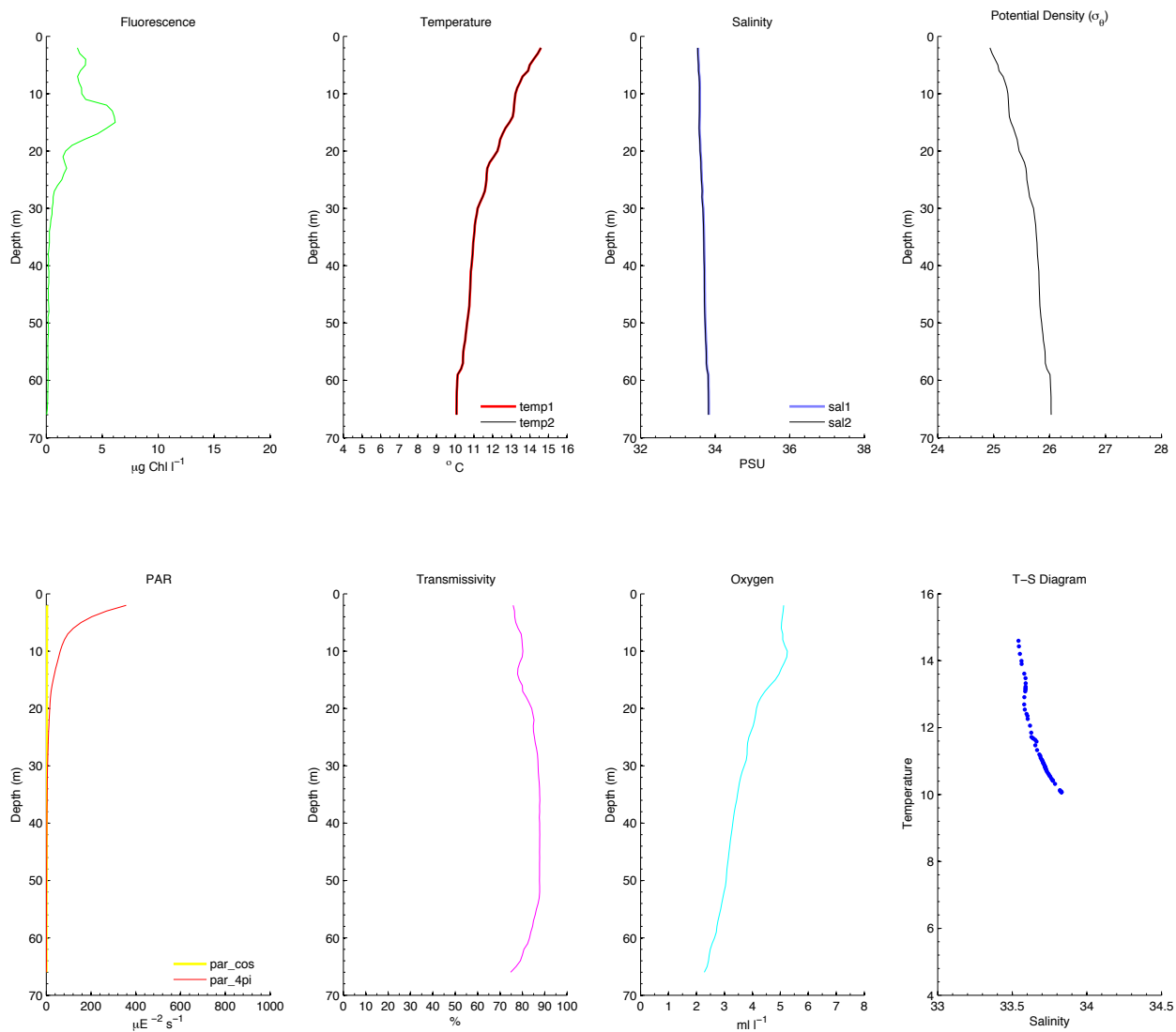
TSS



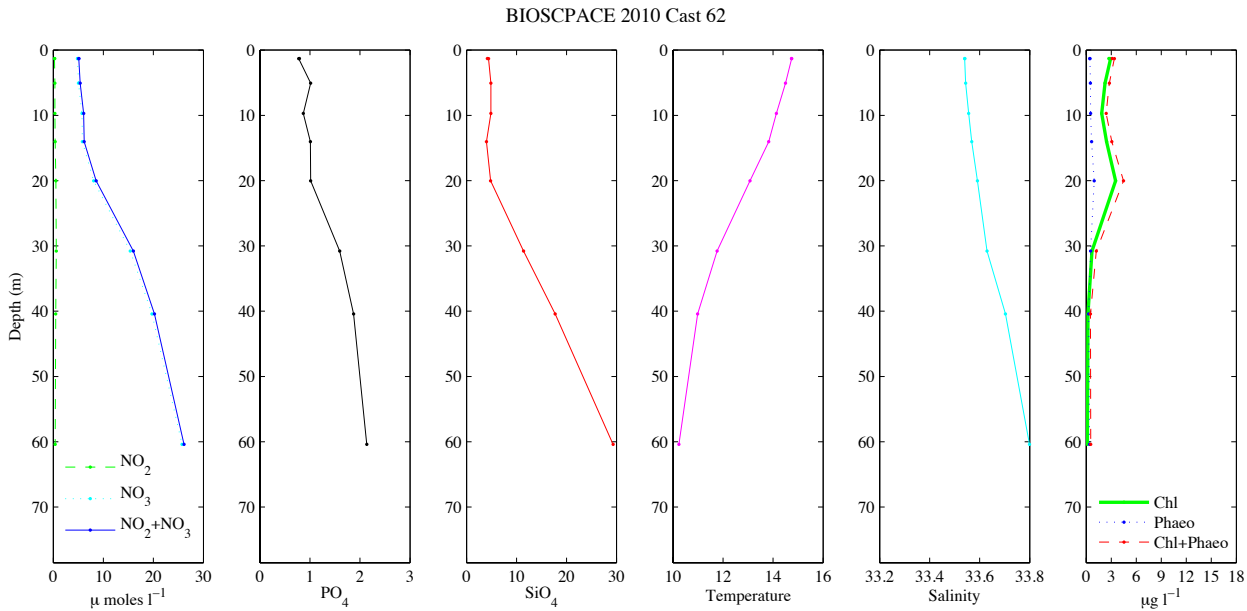
Cast 62 (1200 PDT; [Station BS33](#))
(Plankton net mixed phyto population)

CTD

BIOSPACE 2010 Cast 62 (CTD33; 2010-10-21 19:02:00.000 UTC) CTD Downcast Data (Calibrated)



Bottle Nutrients and Chlorophyll



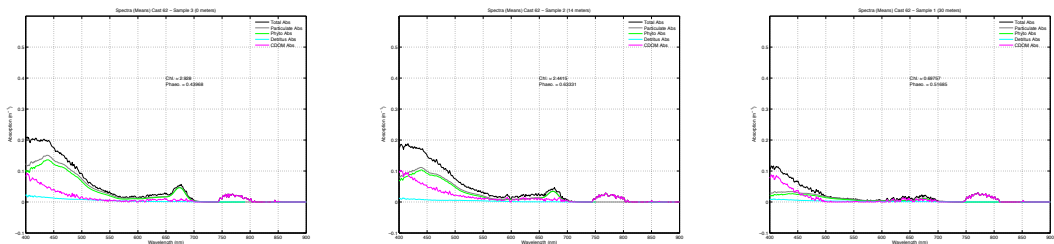
Filter Pad Absorption

Cast 62

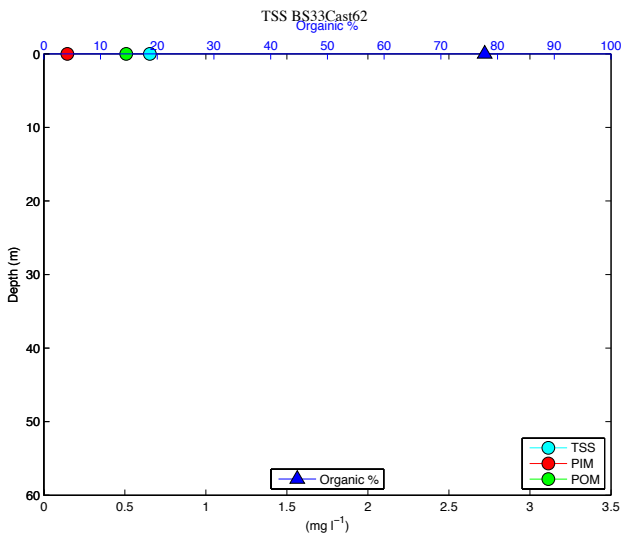
Surface

14m

30m



TSS

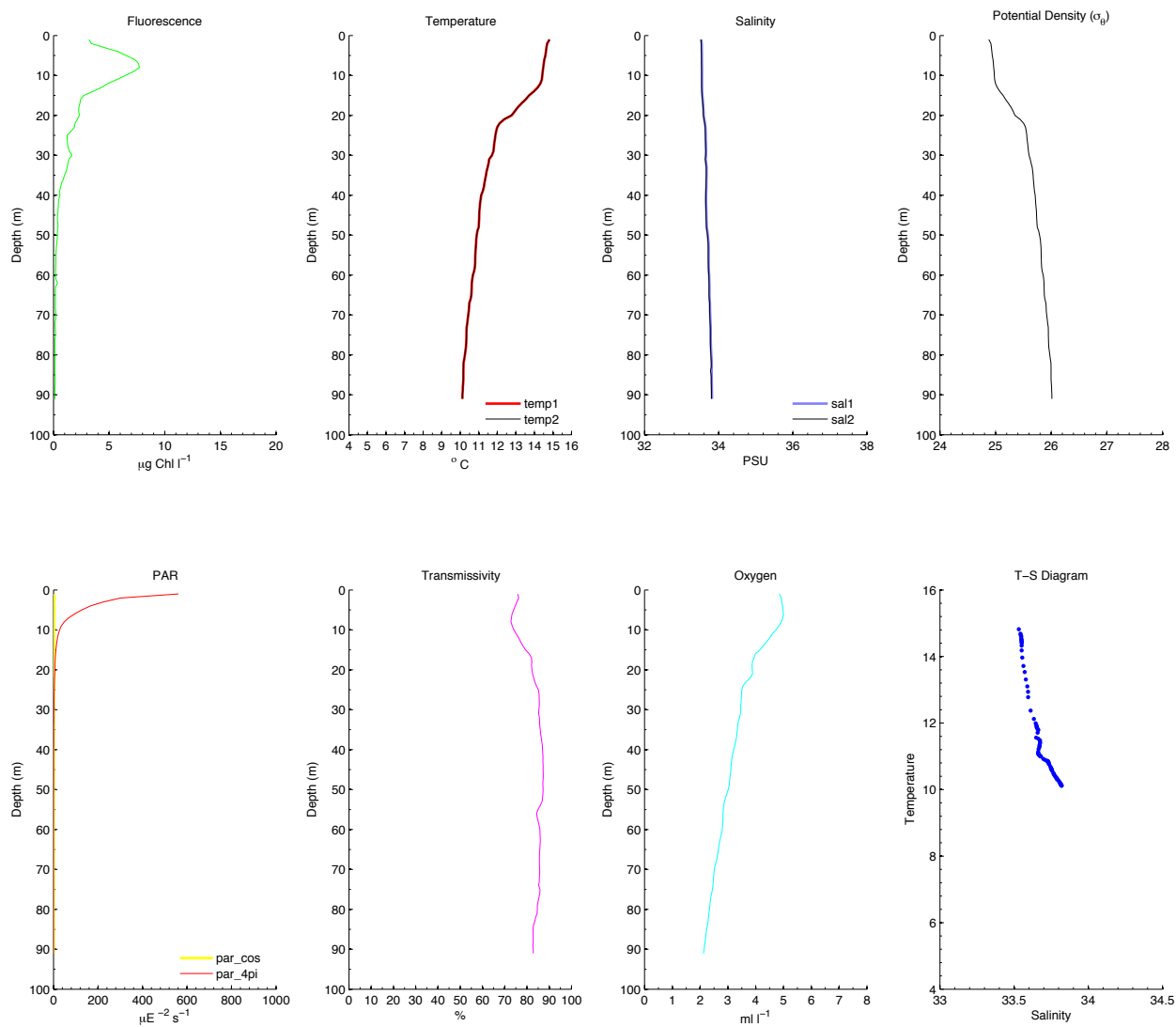


Cast 63 (1250 PDT; [Station BS06](#))

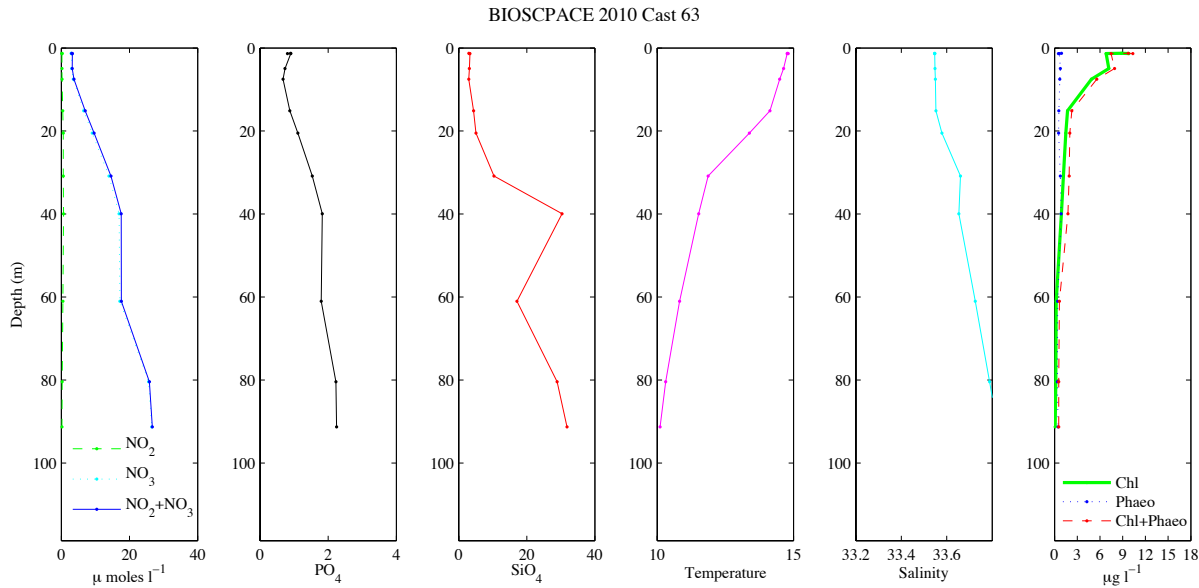
(Plankton net mixed phyto; thicker bloom drifted in while the CTD was down; mixed dinos (mostly *Prorocentrum*) large signal on underway FRR, and CO₂ sensor)

CTD

BIOSPACE 2010 Cast 63 (CTD06; 2010-10-21 19:48:00.000 UTC) CTD Downcast Data (Calibrated)



Bottle Nutrients and Chlorophyll



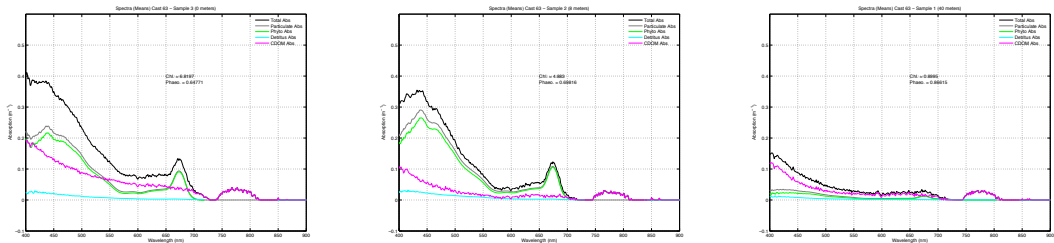
Filter Pad Absorption

Cast 63

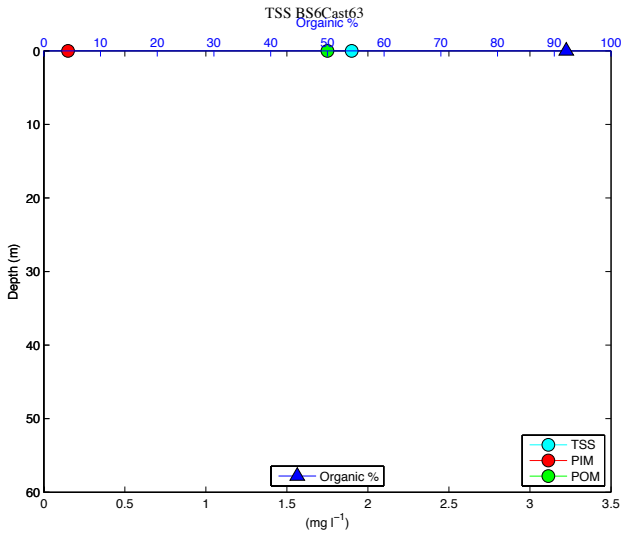
Surface

8m

40m



TSS

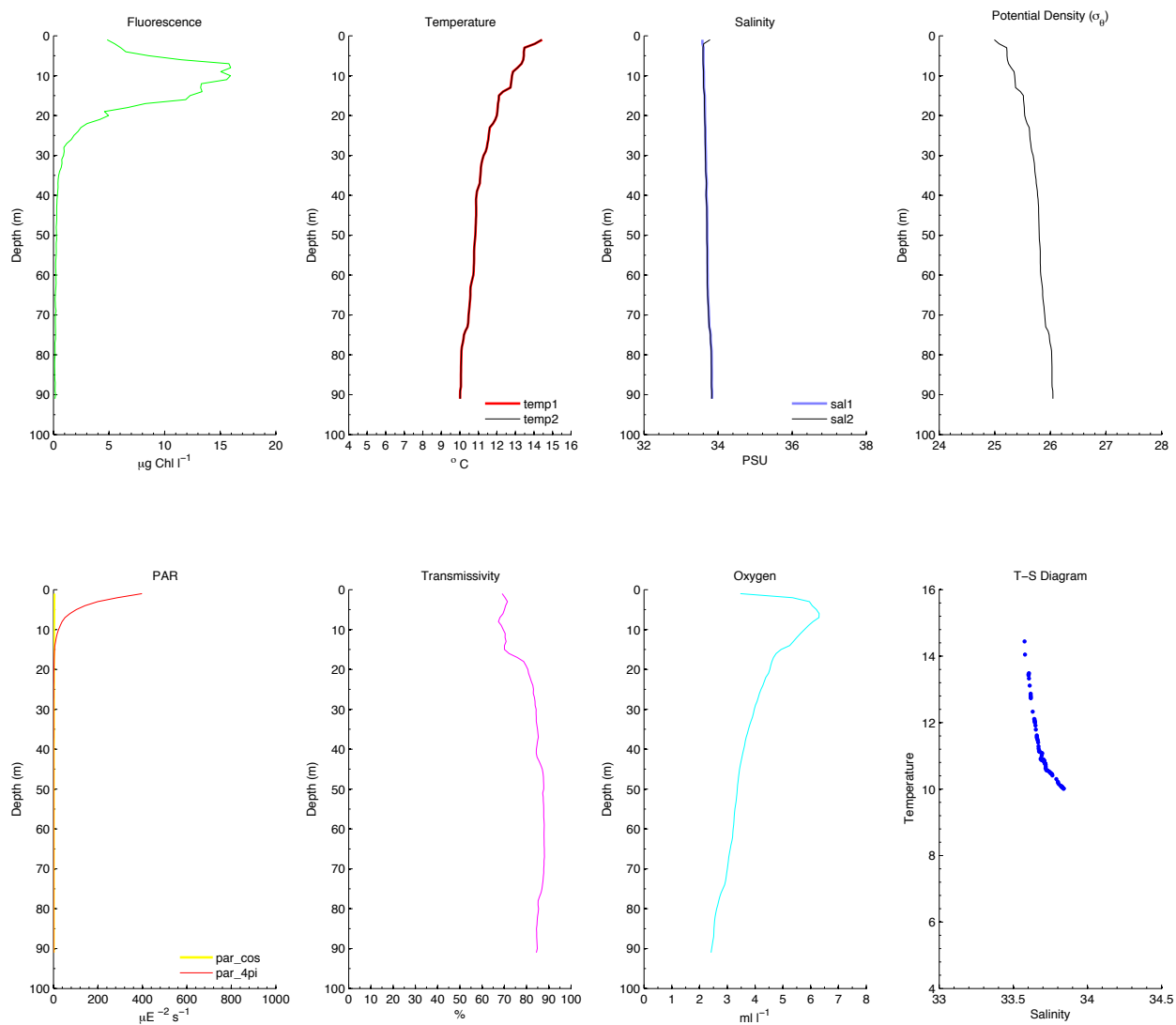


Cast 64 (1449 PDT; [Station BS07](#))

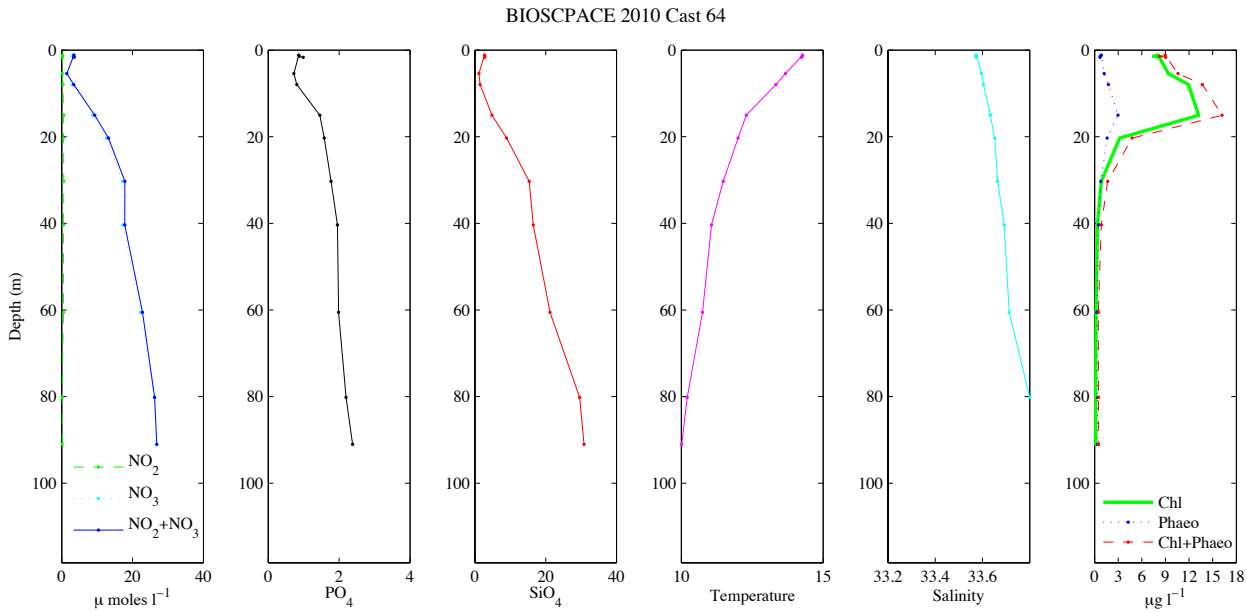
(Plankton net mostly *Prorocentrum* + mixed dinos and some diatoms mostly *Pseudo-nitzschia*.)

CTD

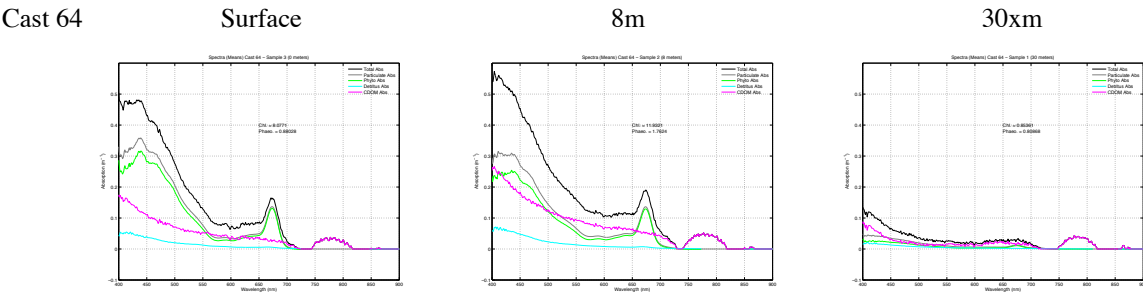
BIOSPACE 2010 Cast 64 (CTD07; 2010-10-21 21:49:00.000 UTC) CTD Downcast Data (Calibrated)



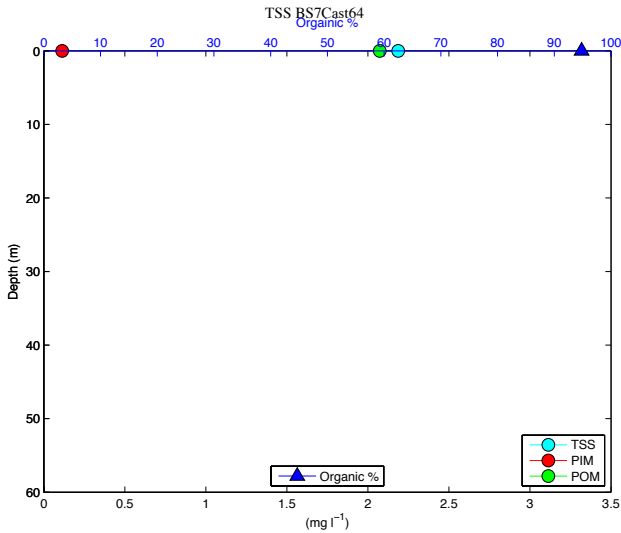
Bottle Nutrients and Chlorophyll



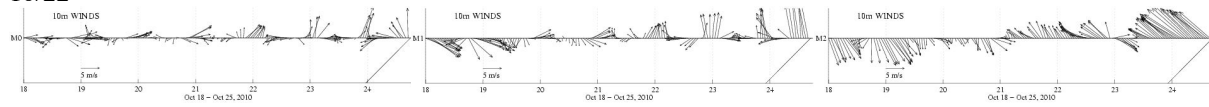
Filter Pad Absorption



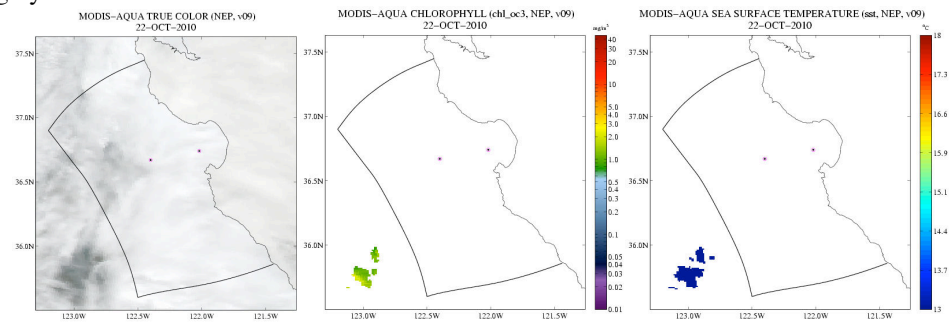
TSS



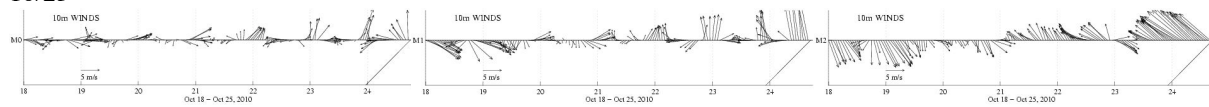
10/22



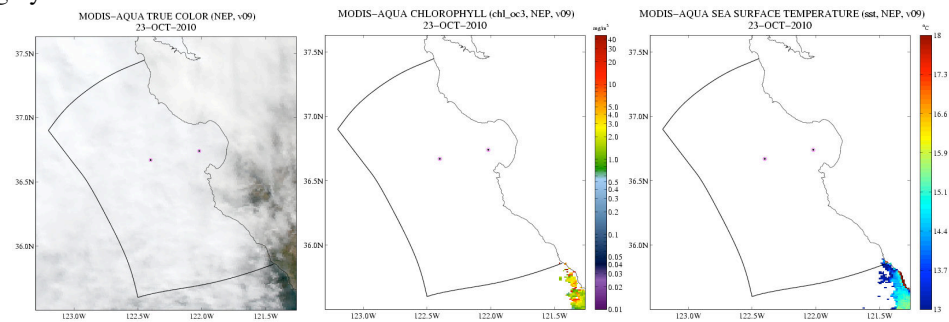
Satellite Imagery



10/23

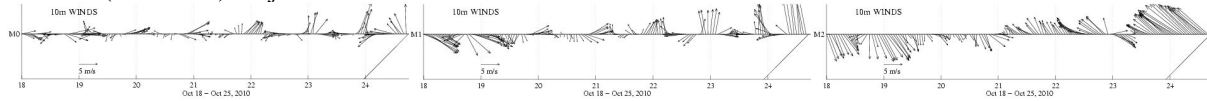


Satellite Imagery

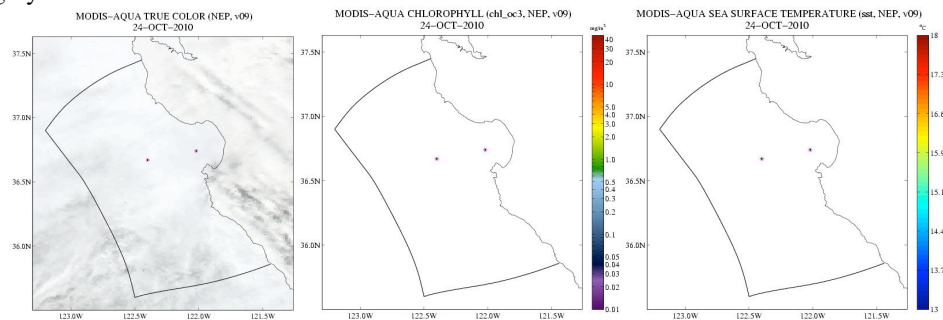


10/24

(relaxation) Major rain event

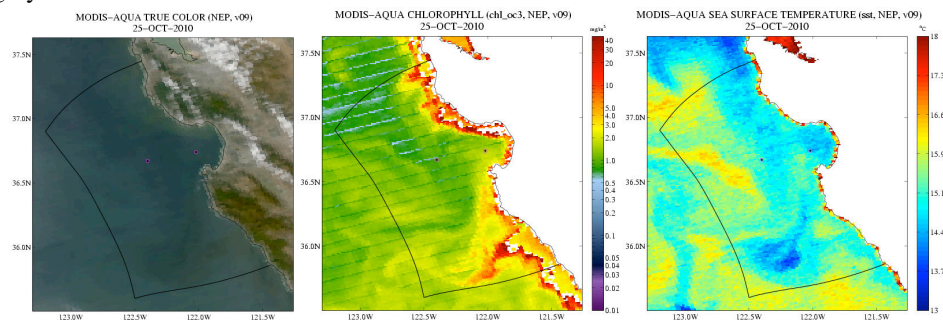


Satellite Imagery



10/25

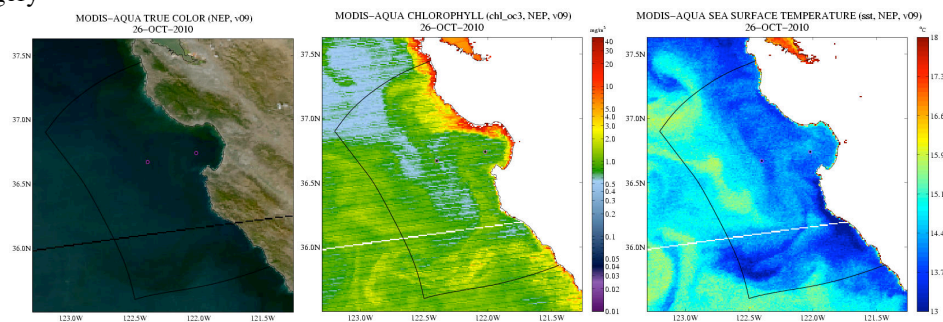
Satellite Imagery



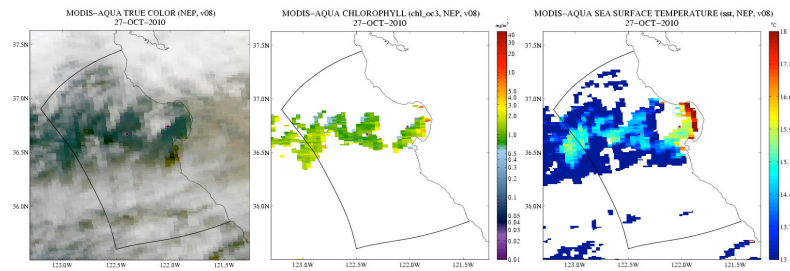
10/26

(upwelling) *Pseudo-nitzschia* and *Prorocentrum micans* blooms concentrate close to shore throughout MB, most intense in north

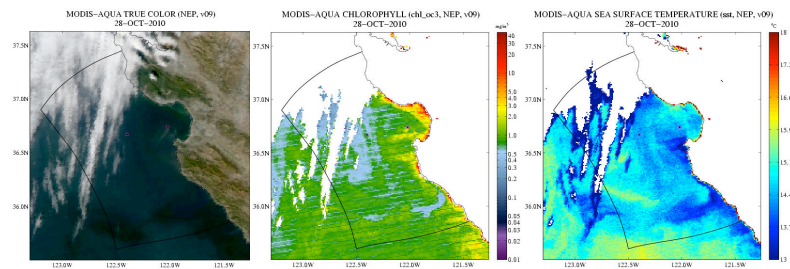
Satellite Imagery



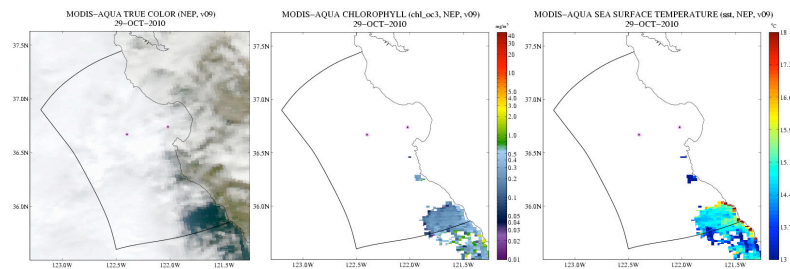
10/27
Satellite Imagery



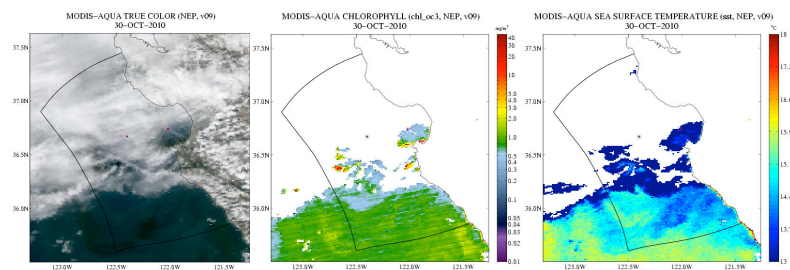
10/28
Satellite Imagery



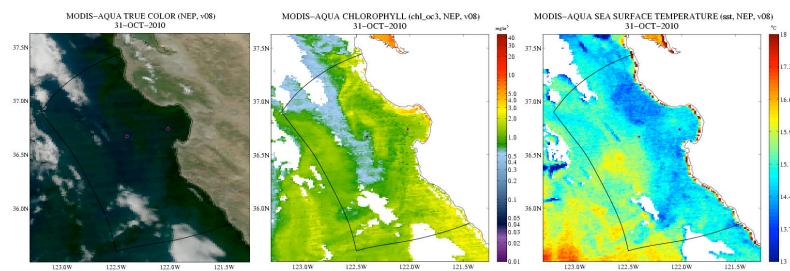
10/29
Satellite Imagery



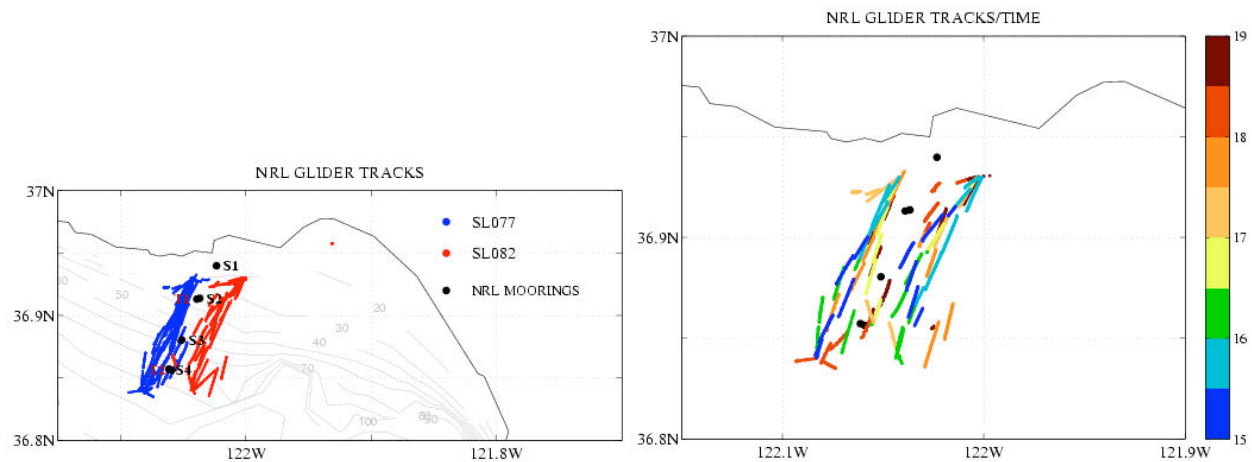
10/30
Satellite Imagery



10/31
Bloom continues near shore throughout MB. CANON ends
Satellite Imagery

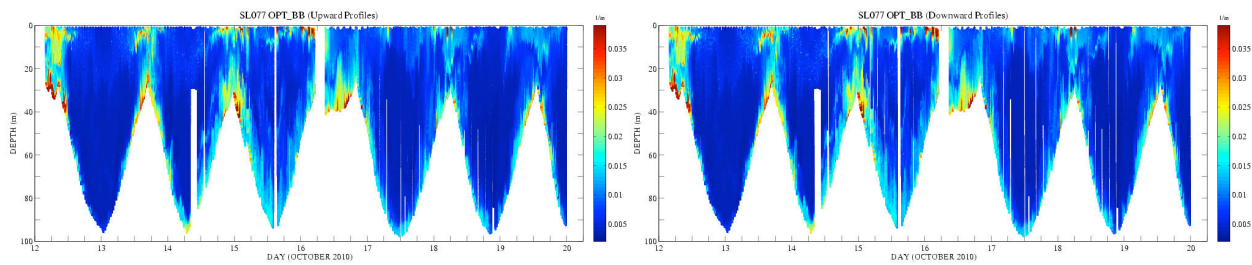


NRL Gliders

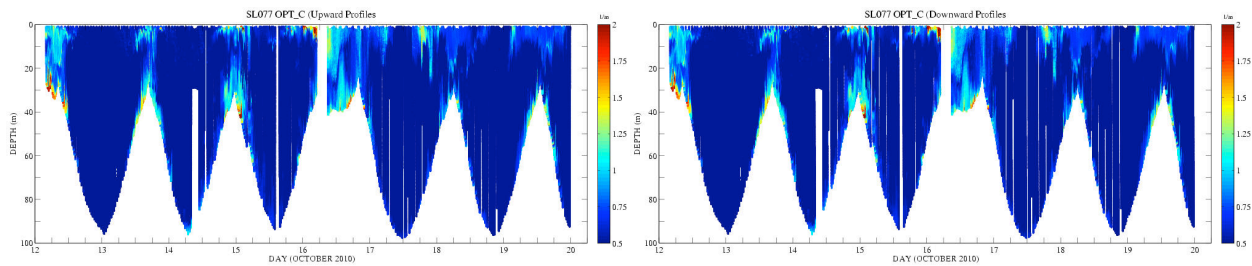


SL077 (offshore)

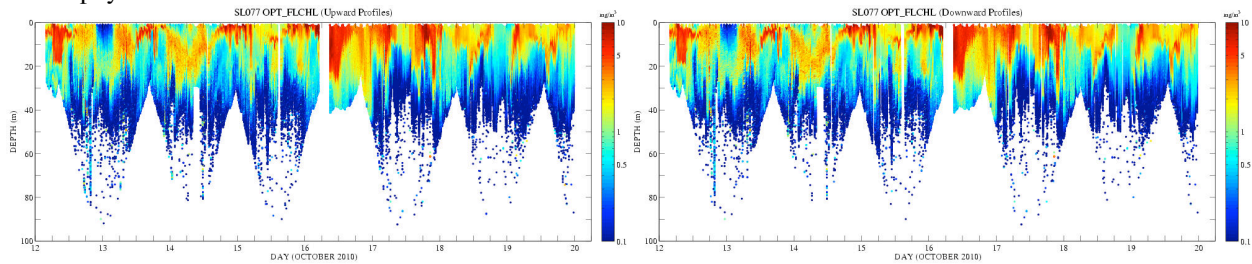
Backscatter



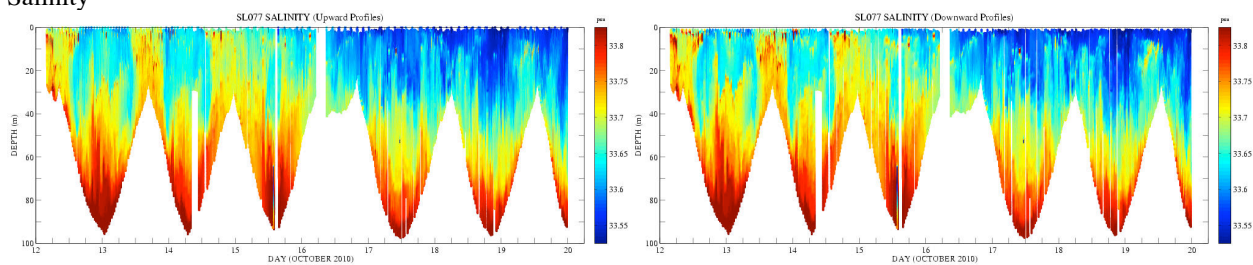
Beam Attenuation



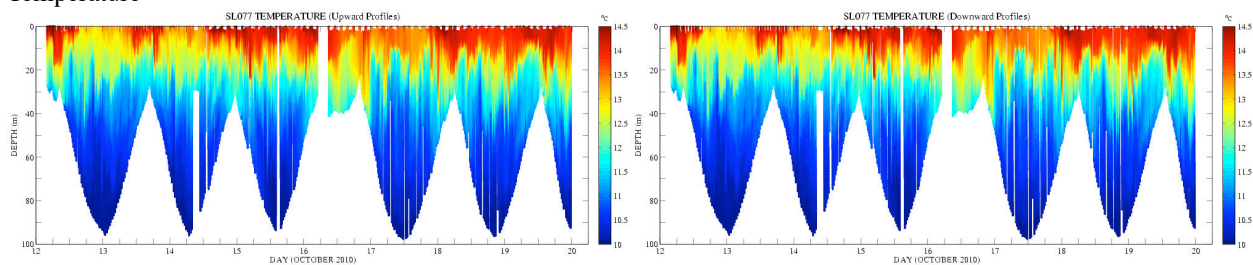
Chlorophyll



Salinity

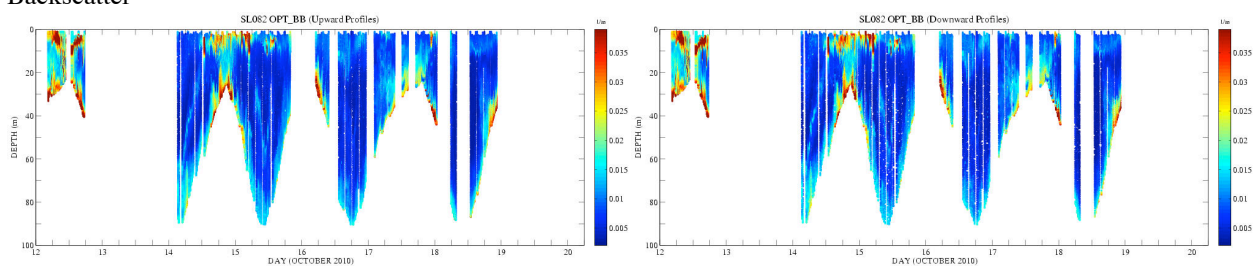


Temperature

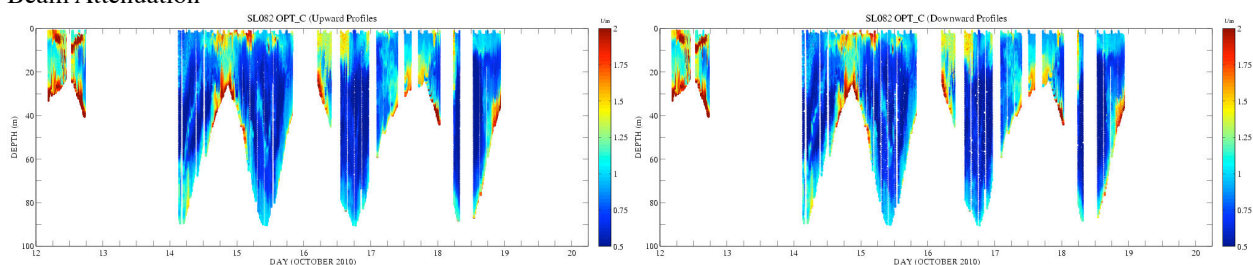


SL082 (inshore)

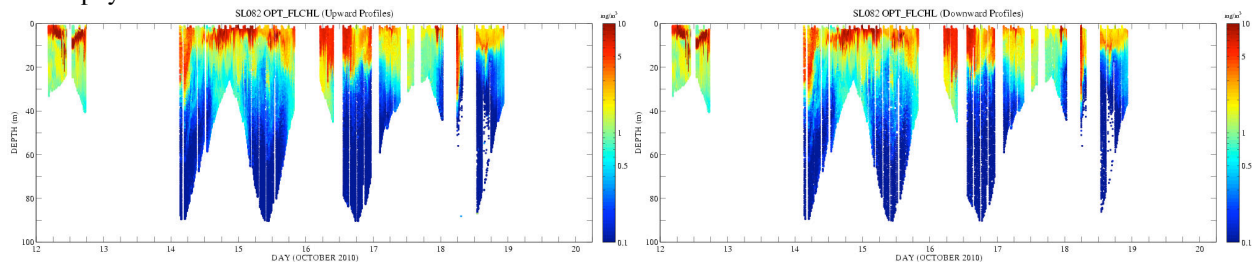
Backscatter



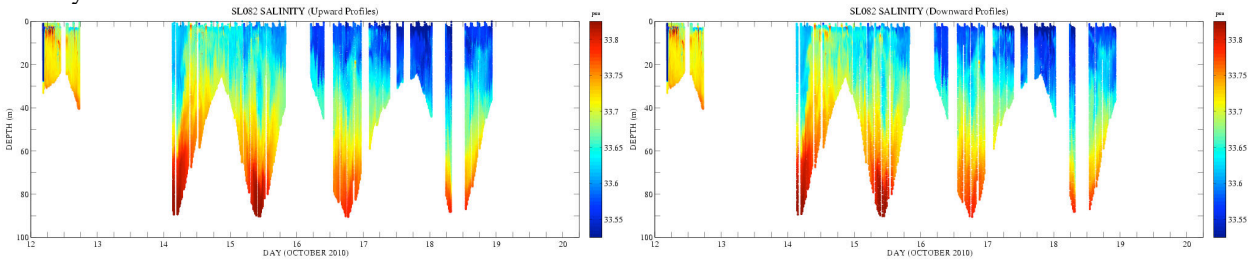
Beam Attenuation



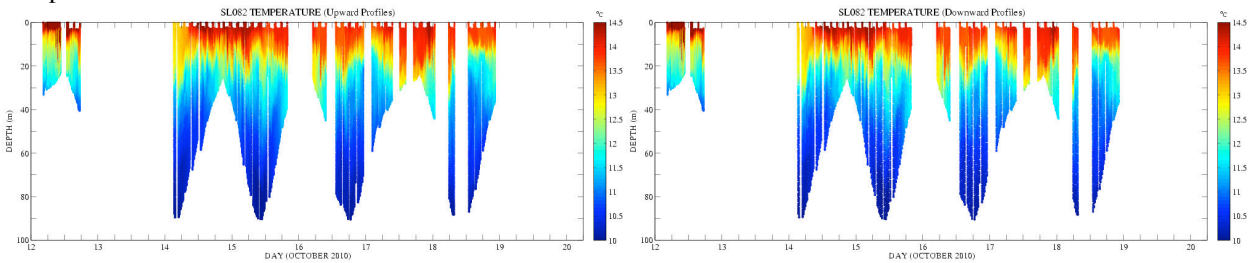
Chlorophyll



Salinity



Temperature



Cruise Log

Date (Local)	Day Of Year	Cast #	Station	station description	time (PDT)	Latitude (degrees)	Longitude degrees	water depth (meters)	secchi_depth (meters)
12-Oct-10	285	2	glider cal	Soquel Cove	0800	36.9575	-121.93165	10	3
		4	glider cal	Soquel Cove	1000	36.9575	-121.9317	11.58	
		5	S1		1600	36.889	-121.025	18	5.5
		6	S2		1743	36.9134	-122.0337	38	5
		7	S3		1830	36.8773	-122.05855	70	
		8	S4		1940	36.5157	-122.0718	86	
13-Oct-10	286	no-cast	Flowthrough	23	1100	36.5495	-122.7185	2000	
		no-cast	Flowthrough	22	1324	36.5495	-122.719	>2000	
		no-cast	Flowthrough	21	1536	36.6901	-122.3309	1350	
		no-cast	Flowthrough	20	1730	36.7398	-122.161	916	
		no-cast	Flowthrough	11	1845	36.7706	-122.02946		
		no-cast	Flowthrough	28	1940	36.8094	-121.9513		
		no-cast	Flowthrough	29	2023	36.8325	-121.881		
14-Oct-10	287	9		scanfish cal	0723	36.459	-122.6828	2906	10
		10	BS23	CTD sta 23	0903	36.5497	-122.7223	2921	10
		11	BS22		1217	36.621	-122.5137	2617	10
		12	BS21		1431	36.6891	-122.3119	1363	11
		13	BS20		1700	36.7366	-122.1478	1035	11
		14	BS11		2000	36.7718	-122.03075	891	
		15	BS28		2150	36.8121	-121.9569	90	
		16	BS29		2254	36.8409	-121.8826	62	
15-Oct-10	288	17	BS27		0910	36.3141	-122.5807	2518	11
		18	BS26		1154	36.3809	-122.3824	1380	10
		19	BS25		1428	36.4495	-122.177	1108	12
		20	BS24		1619	36.4498	-122.0396	550	9
		21	BS09		1824	36.6208	-122.0217	222	13
		22	BS10		1938	36.6726	-121.9714	99	
16-Oct-10	289	23	BS05		0748	36.9286	-122.0305	27	5
		24	31		0900	36.931	-121.9698	26	5
		25	4		1000	36.93	-121.9004	18	5
		26	3		1050	36.8903	-121.8715	22	2
		27	32		1205	36.8896	-121.8706	30	7
		28	30		1317	36.885	-122	47	
		29	6		1436	36.8393	-121.9806	98	
		30	33		1602	36.8463	-121.9143	70	
		31	2		1731	36.851	-121.8401	23	11
17-Oct-10	290	32	time series1		0650	36.9237	-121.9617	27	
		33	time series2		0730	36.914	-121.9699	30	8
		34	time series3		0817	36.9066	-121.9698	32	
		35	time series4		0838	36.8899	-121.9787	39	
		36	time series5		0905	36.874	-121.9862	58	
		37	time series6		0959	36.8624	-121.9935	73	4
		38	time series7		1206	36.8779	-121.994	55	4
		39	time series8 (BS13)		1330	36.9398	-122.143	56	4
		40	BS16		1457	36.9993	-122.28	71	
		41	BS16		1630	36.0021	-122.2859	71	5
		41B	BS16		1730	36.0021	-122.286	71	
		42	BS16		1830	37	-122.2801	71	
		43	BS16		1930	36.999	-122.2784	71	
18-Oct-10	291	44	BS05		0800	36.9301	-122.0323	29	8
		45	BS06		0940	36.8399	-121.9799	99	
		46	BS07		1151	36.7498	-121.9212	99	5
		47	BS08		1343	36.671	-121.8692	67	12
		48	BS10		1509	36.6696	-121.9695	101	8
		49	BS11		1635	36.7695	-122.0307	940	12
		50	BS12		1830	36.8497	-122.092	96	9
		51	BS13		1950	36.94	-122.1404	53	
19-Oct-10	292	52	BS05	time series B1	0800	36.9305	-122.0337	30	6
		53	BS05	time seriesB2	0900	36.9293	-122.0325	30	
		54	BS05	time seriesB3	1000	36.9291	-122.0297	30	4
		55	BS05	time series B4	1100	36.9304	-122.0302	30	3.5
		56	BS05	time series B5	1200	36.9295	-122.0312	30	4.5
		57	glider groucho	post cal	1254	36.9201	-122.0077	30	
20-Oct-10	293	no-cast	Flowthrough	flowthrou A	1215	36.8293	-121.9683	400	
		58	glider Harpo	post cal	1300	36.8314	-122.063	2	
		no-cast	Flowthrough	flowthrou B	1730	36.8874	-122.486	70	
21-Oct-10	294	59	BS31		0850	36.9703	-121.9662	26	
		60	BS04		1000	36.9285	-121.9021	20	
		61	BS32		1045	36.8876	-121.9363	35	
		62	BS33		1200	36.848	-121.9135	69	
		63	BS06		1250	36.84	-121.9818	99	
		64	BS07		1449	36.7552	-121.9254	100	

cloud_coverage (percent)	Sky conditions	wind_speed (m/sec)	wind_direction	wave_height (meters)	LISST	MVSM	HyperPro	Spectrex
no clouds; haze		1.4	277	calm				
	foggy	0.31	264		x	x	x	x
fog	foggy	4.22	244.6	0.25	x	x		
fog	foggy	1.85	233.8		x	x		
dark + fog	foggy	1.29	198.8		x	x		
dark	foggy	0.36	134.2		x	x		
fog		2.52	204.3					
fog		2.42	241.2					
fog		2.6	288.5	0.5 (swell)				
fog		2.7	272.8	0.5 (swell)				
night		2.4	245					
dark		0.67	308.9	calm				
night		1.34	32.95					
clear	clear, sunrise	3.81	5.985	calm	x	x		
haze	clear, some haze	1.75	46.85	calm	x	x	x	x
	clear, some haze	1.44	299.8	calm			x	x
fog	foggy	0.83	183.2		x	x	x	
fog	foggy	3.89			x	x	x	
night fog	foggy, dark	1.54	72.01	calm	x	x		
night	foggy, dark	0.62	18.59	calm	x	x		
night	foggy, dark	1.54	29	calm	x	x		
	foggy	1.8	89.99	calm	x	x	x	
100	overcast	2.16	152.8	calm	x	x	x	
100	overcast	5.2	171.7	1-2 (swell)	x	x	x	
100	overcast	3.65	212.5		x	x	x	
100	overcast, twilight	2.16	218.3		x	x		
	overcast, dark	0.72	245.5		x	x		
100	foggy	2.62	122.9	calm	x	x		
	foggy	1.5	167.3	flat	x	x		
	foggy	0.26	100.7		x	x		
100	foggy	1.6	176.6	none	x	x		
100	foggy	3.3	280.1	calm	x	x	x	
100	overcast, but clearing	3.86	282.7		x	x	x	x
100	mostly overcast, some patches of blue	6.33	302.7		x	x	x	
100	mostly overcast, some patches of blue	7.72	281		x	x	x	
100	mostly overcast, some patches of blue, twilight	5.76	243		x	x		
100	overcast, dark	0.72	329.8					
100	overcast, sunrise	1.85	309.7		x			
100	overcast, light rain	1.24	159.1					
100	overcast	0.36	359.3					
100	overcast	1.75	316.2		x	x		
100	overcast	7.31	330.7		x	x		
100	rain	3.29	284.6		x	x		
100	mostly overcast, some patches of blue	5.35	285.8		x	x		
100	overcast	9.05	329.6	1	x	x		
90	overcast, but clearing		324.8	1-2 m	x	x	x	
	partly sunny				x			
	partly cloudy, sunset	9.05	328.3		x	x		
	dark	7.92	310.6		x	x		
90	partly cloudy	2.5	86.86	calm	x	x		
50	partly cloudy	3.19	108.3	calm	x	x	x	x
40	mostly sunny	9.05	343.2	1	x	x	x	x
50	clear, some haze	3.76	287.6	1	x	x	x	x
50	mostly sunny	7.97	306.6	2 to 3	x	x	x	x
50	mostly sunny	9.77	306.7	2 to 3	x	x	x	x
dusk	sunset, hazy	6.74	303	1	x	x		
dark	dark	7.5	305.4	1	x	x		
	fog	0.93	306.8	calm	x	x		
	fog	0.41	4.726	dead calm	x			
	fog	1.7	376.1	calm	x	x		
	fog	1.4	292.6	calm	x			
80	fog	1.4	223.2	calm	x	x	x	x
100		4.4	271.1	calm				
100		4.7	310	calm				
90			305.9	2				
80		4.8	292.4	1				
100		1.95	45.58	calm				
80		1.29	142.3					
		1.9	132.5					
		1.4	189.3	calm				
70		2.1	192.9	calm				
100		5.1	247.6					

Comments
Glider calibration station - Soquel Cove NE MB
Glider calibration station - Soquel Cove NE MB
profile laptop time switched to GMT at 0450 P.M; hyperpro laptop time on GMT
SST = 14.85; SSS = 33.24
scanfish cal@ scanfish waypoint 21
Problem with optics package short circuited pump cable
Lots of jellies; Jellies on ECO-FL2-BB??
Lots of jellies
2 subsurface peaks in flouro. Took samples @s at surface and each peak
no TSS from deep bottle ; surface sample has Prorocentrum (microscope); grass, other debris on surface
water color brown + mixed dinos
Hyperpro Lu sensor not updating then started working
plankton net: mixed dinos (Prorocentrum and Ceratium predominated) no diatoms. A large bloom passed under boat during the station - CTD cast, water samples and hyperpro missed it; the optics p
near MBARI mooring - took 3 surface bottles
none
missed patch -no samples
20m-water through phyto net>microscope>some pseudonitzchia
no samples - missed bloom
none
surface net tow-microscope diatom chains- 1 prorocentrus; diatom bloom
plankton net tow-mixed diatom chains, pseudonitzchia, prorocentrum, mixed dinos
plankton net tow-same as prvious station -no photos ship is too fast; mixed diatoms and dinoflagellates
plankton net still mixed phyto -maybe more prorocentrum here
Prorocentrum bloom monospecific Found them!!
CTD +optics +hyperpro+ plankton net + CTD flourometer; NO water samples, no vertical migration
optics only
plankton net -still prorocentrum (micans?)
none
fluorescence profile -flat
none
none
sharp layer on fluorometer @ 15 m
none
near MBARI M1
none
plankton net back to the Prorocentrum bloom -high chlorophyll in MODIS imagery
plantkton net: Prorocentrum bloom. Start of time series B, bottles at 27 m then every 2 meters to the surface. FCMG samples (for flow-cytometer) taken from all bottles.
CTD and optics cast only - no bottles
bloom at surface
CTD and optics cast only - no bottles
very thick surface patch came after the bottles. Optics were below (note: check flowthrough data for this signal). Flowthrough FRRs showed a very strong signal when this patch passed. The flow-th
CTD cast to 27 m, bottles @surface; cleaned glider window,bucketsample for chlorophyll
none
all samples; clean glider and chlorophyll surface - MODIS overflight 13:24 local - surface sal 33.39
none
1) plankton net-mixed dinos-surface, 2) plankton 10m (flour peak) also mixed dinos
Plankton mixed dinos; some diatoms chains + pseunitzchia (few)
Plankton net mixed dinos and pseudonitzchia
Plankton net mixed phyto population
Plankton net mixed phyto; thicker bloom drifted in while the CTD was down; mixed demos (mostly Prorocentrum) large signal on underway Flr, and C02 sensor
Plankton net mostly Prorocentrum + mixed dinos and some diatoms mostly Pseudonitzchia.

Acknowledgments

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